

Showcase Europe

Guide to M-commerce Markets in  
Europe

*Your Global Business Partner*

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# 1. European Union

## **1.1 Introduction**

1. An understanding of the threats, opportunities and compliance requirements triggered by EU policy and regulatory developments is essential to anticipating the future direction of the region's M-commerce market. This report highlights some of the more significant of these developments. It looks forward to what will shape the market
2. There is no legislation on m-commerce as such but the EU is very active in working to secure a stable legal and regulatory environment for e-commerce. The first part of this report focuses on this. It covers the recently adopted Directives on e-commerce and electronic signatures, looks at EU policy on protecting personal data and bolstering consumer confidence, and at initiatives to encourage the roll-out of secure payments and financial services on the Net. All of the above have implications for businesses looking to exploit m-commerce. They represent more opportunities than threats but raise some concerns nevertheless.
3. Clearly, legislation affecting the mobile communications sector is important for the future of m-commerce. The second section therefore focuses on the possible impact of the new proposed new framework for electronic communications. This will replace the existing rules on telecoms in a few years' time but operators and service providers are now working actively to try and ensure that it provides the most mobile-friendly environment possible.
4. EU competition policy is important for the mobile sector. The European Commission is currently using its powers in this area to investigate high roaming prices and call termination rates. The report touches on this before concluding with the European Commission's response to the high 3G license fees paid by some operators in national markets.

## **1.2 E-Commerce Directive**

5. The **E-Commerce Directive**<sup>1</sup> applies internal market rules to on-line business and must be implemented by 17 January 2002. If a service provider complies with the laws of the Member State in which it is established it is free to market its services in all other EU countries except where these impose measures in the interest of consumer protection, public health and public safety.

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<sup>1</sup> Directive 2000/31/EC on certain legal aspects of information society services, in particular electronic commerce, in the internal market  
[http://europa.eu.int/comm/internal\\_market/en/media/electcomm/com31en.pdf](http://europa.eu.int/comm/internal_market/en/media/electcomm/com31en.pdf)

6. The Directive covers all services conducted over the Net and sets the place of establishment as where a provider pursues an economic activity through a fixed establishment, irrespective of where its web-sites or servers are situated. Businesses offering services will have to make available basic information concerning their activities including name, address, e-mail and VAT number. The Directive includes a liability exemption for intermediaries where they play a passive role as a *mere conduit* of information from third parties, and limits service providers' liability for other *intermediary* activities such as the storage of information (i.e. caching).
7. The Directive imposes certain specific requirements with respect to advertising and marketing on-line. These commercial communications must not be misrepresented as something else and must identify their source. Under **EU telecoms privacy legislation**<sup>2</sup> Member States are given the choice between an opt-in system, under which unsolicited commercial communication may be sent only with the consent of the recipient, or an opt out system, under which the recipient is to signal himself if he does not wish to receive such contacts. The Directive requires that companies looking to target customers on-line consult these opt-out registers regularly.
8. When an order is placed the service provider must acknowledge receipt quickly and by electronic means although the Directive does not attribute any legal effect to the placing of an order or its acknowledgment. Whether a contract has been entered into and at what time the contract has been concluded are issues governed by national law.
9. While it does bring compliance obligations the Directive's principle objective is to simplify things for companies doing business in the EU. It will have a positive impact on M-commerce by offering a more predictable legal environment. Its provisions do not apply to service providers established in the United States.

### 1.3 Electronic Signatures Directive

10. The **Electronic Signatures Directive**<sup>3</sup> aims to facilitate the use of electronic signatures and contribute to their legal recognition. It defines requirements for certification service providers to ensure a guaranteed minimum level of security and to allow them to deliver their services across the EU. This stable legal framework for authentication on-line will boost M-commerce. The Directive must be implemented by the member states before **19 July 2001**
11. The Directive draws a distinction between advanced electronic signatures and the rest. The advanced versions have the same value as a handwritten signature and must fulfil a series of criteria which draw inspiration from available technology such as PKI. These advanced signatures must be uniquely linked to the signatory; be capable of identifying the signatory; be created using means that the signatory can maintain under his sole control; and be linked to data to which it relates in such a manner that any subsequent change of the data is detectable.
12. Other regular electronic signatures are broadly defined as data in electronic form which is attached to or logically associated with other electronic data and serves as a method of

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<sup>2</sup> Directive 97/66 concerning the processing of personal data and the protection of privacy in the telecommunications sector  
<http://europa.eu.int/ISPO/infosoc/telecompolicy/en/9766en.pdf>

<sup>3</sup> Directive 99/93 on Electronic Signatures  
<http://www.ict.etsi.org/eessi/e-sign-directive.pdf>

authentication. Both advanced and regular electronic signatures are admissible as evidence but courts have broader discretionary authority in assessing the probative value of the latter.

13. The Directive is based on a technologically neutral approach so it covers the widest range of technologies from digital signatures to biometrics. However the Commission has mandated European Standards bodies to work on specifications through the **European Electronic Signature Standardization Initiative**.<sup>4</sup>

#### 1.4 Data Privacy

14. Personal Data is a valuable commodity in the digital economy. Indeed the unique selling point of the Internet is arguably that you can better target your customer. In m-commerce this is particularly pertinent as the technology available already permits marketers to literally target customers through location based services. However there is a delicate balance to be struck between proactively offering targeted goods and services, and invading privacy. The EU approach to this is a comprehensive set of rules enforced by independent national data protection authorities and known as the **Data Protection Directive**<sup>5</sup> (deadline for national implementation October 1998). The Directive requires the European Commission to assess the adequacy of controls put in by third countries before allowing transfers of data outside of the EU
15. The United States **Safe Harbor program**<sup>6</sup> is a response to this requirement and was agreed by the Commission in July 2000. Companies that abide by Safe Harbor obligations must tell customers why they are collecting personal information, how they intend to use it and whether they will transfer it to third parties. Data subjects have to be given the chance to say no; and must say yes if the data is very sensitive. Their consent is required before the data can be transferred on to other parties and they must be allowed access to their files.
16. To address specific privacy matters arising from the Internet the Commission has proposed a **new Directive**<sup>7</sup>, which would update the **Telecom Privacy Directive**<sup>8</sup> It sets out technologically neutral privacy legislation for all electronic communications over public networks.

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<sup>4</sup> European Electronic Signature Standardisation Initiative

<http://www.ict.etsi.org/eessi/EESSI-homepage.htm>

<sup>5</sup> Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data

[http://europa.eu.int/comm/internal\\_market/en/media/dataprot/law/index.htm](http://europa.eu.int/comm/internal_market/en/media/dataprot/law/index.htm)

<sup>6</sup> Safe Harbor

<http://www.export.gov/safeharbor/>

<sup>7</sup> Proposal Com(2000)385 for a Directive of the European Parliament and of the Council concerning the processing of personal data and the protection of privacy in the electronic communications sector

<http://europa.eu.int/ISPO/infosoc/telecompolicy/review99/Welcome.html>

<sup>8</sup> Directive 97/66 concerning the processing of personal data and the protection of privacy in the telecommunications sector

<http://europa.eu.int/ISPO/infosoc/telecompolicy/en/9766en.pdf>

17. One key provision is that opt-in would become the default for direct marketing so companies seeking to target services at users on the move would only be able to do so if the user had given his explicit consent to receiving such targeted communications. The Commission argues firstly that this is a natural extension of provisions in the existing Directive (i.e. opt in for automated fax mailings), and secondly that studies are indicating that "permission based marketing" is proving a more effective and viable method of data collection.
18. The proposed Directive would also impact significantly on m-commerce's key added value, namely the ability of a cellular network to determine where a user is at any time. Location will be even more precise with 3G mobile allowing targeted location sensitive services such as news, traffic, reservations and ticketing. Article 9 of the proposal says that providers must provide their specific consent to being locatable and must have a simple means of temporarily refusing the processing of such location data for each connection to the network.
19. Member States and the European Parliament are currently examining this proposal. It is likely to undergo at least some changes in that process, will not be adopted before the end of the year, and is unlikely to be fully implemented before 2003. Nevertheless the direction is clear and for m-commerce the implications important.

## 1.5 Cybercrime

20. The Commission's **Communication on Cybercrime**<sup>9</sup>, adopted in January 2001, calls for an approximation of national laws in the area of high-tech crime and the setting up of an EU Forum to raise public awareness on the risks posed. The Forum will represent law enforcement agencies, service providers, network operators, consumer groups and data protection authorities, and aims to promote best practices for information technology security. Its work should be followed closely. Critically for the M-commerce sector the Commission will assess the need for a legislative initiative on the issue of data retention on the basis of work conducted by the Forum.
21. Some EU countries are requiring or allowing service providers to keep data when not strictly needed but where it could be useful for criminal investigation. It is financially and administratively burdensome for service providers to hold on to such data and different approaches by Member States risks distorting the Single Market. Existing data protection law sets out that data can only be kept for billing purposes and that it should be deleted or rendered anonymous once it is no longer required for this commercial purpose.
22. The issue of interception creates similar problems. Under EU law there is a general principle of confidentiality of communications but national administrations can order interception according to strict rules. In the past this was simple to organize but now, faced with a plethora of service providers, some EU countries are introducing new technical interception requirements. Once again the integrity of the Single Market is threatened and, just as importantly, such initiatives may threaten user confidence in the security of conducting transactions online. What is important in the cybercrime debate is that the same encryption technologies that nurture user confidence can also be used to hide criminal activity.

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<sup>9</sup> COM 2000/890 Communication on Creating a Safer Information Society by Improving the Security of Information Infrastructures and Combating Computer-related crime <http://europa.eu.int/ISPO/eif/InternetPoliciesSite/Crime/crime1.html>



## 1.8 On-line Payments

27. The roll out of value added services over mobile networks will depend on the implementation of trustworthy payment systems in the on-line environment. The Commission's Communication on E-commerce and Financial Services raises the possibility of a legislative safety net for consumers making payments on-line, similar to the US chargeback system. In the EU there are some chargeback initiatives but, with a few exceptions, they are not grounded in Member State law. Instead they are offered following an agreement between the card issuing bank and the merchant's bank.
28. The Commission's **Communication on fraud prevention**<sup>13</sup> also addresses problems involved with paying on-line. It calls on the payment industry to provide the highest economically viable level of security for remote electronic payments by mid2002 at the latest. The Commission plans, in addition, to set up a Forum on security of payment products. This move should be followed in conjunction with the eEurope Smart Card initiative.
29. Smart Cards are singled out in the eEurope Action Plan as an effective means of addressing security concerns in a digital environment. The perception is that Europe has a solid smart card industry and that is only prevented from developing its full potential due to a lack of common standards and applications. The **eEurope Smart Card**<sup>14</sup> initiative has now triggered the setting up of twelve industries led working groups known as Trailblazers, which are working to establish specifications and guidelines on issues ranging from E-payments to security certification. Almost all are relevant to m-commerce applications.

## 1.9 Proposed New Framework for Electronic Communications

30. The existing regulatory framework for telecommunications was implemented as a means to generate competition by defending the rights of new entrants as they attempted to take market share from dominant incumbents. The proposed **new framework for electronic communications**<sup>15</sup> (12 July 2000) takes account of increased competitiveness and convergence in the market. It aims to roll back sector specific regulation and let competition law patrol a competitive market. In the meantime sector specific rules would continue to apply.
31. There is concern among some mobile operators that under the proposed new rules they might be subject to more regulation than is currently the case. The Commission would be responsible for producing lists of markets that might lack effective competition (mobile termination for example) and then it would be for National Regulatory Authorities to decide, using Commission guidelines, on whether regulation should be withdrawn, maintained or introduced.

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<sup>13</sup> Communication 2001/11 on preventing fraud and counterfeiting of no-cash means of payment  
[http://europa.eu.int/comm/internal\\_market/en/finances/payment/fraud/cardfraud.htm](http://europa.eu.int/comm/internal_market/en/finances/payment/fraud/cardfraud.htm)

<sup>14</sup> eEurope Smart Card Initiative  
[www.cordis.lu/ist/ka2/smartcards.html](http://www.cordis.lu/ist/ka2/smartcards.html)

<sup>15</sup> Proposed regulatory framework for electronic communications  
[http://europa.eu.int/comm/information\\_society/policy/framework/index\\_en.htm](http://europa.eu.int/comm/information_society/policy/framework/index_en.htm)



32. The key question for mobile operators is how 'significant market power' (SMP) in any given market will be calculated under the new proposals. Once a regulator has decided that an operator does enjoy SMP, it can impose obligations on the company in question, in some cases cost-oriented pricing. Large mobile operators argue that this regulatory uncertainty combined with difficulties in financing may slow down the roll out of 3G infrastructure and services. This could impact negatively on the growth of value added m-commerce.
33. The other big issue at stake is the extent to which the greater autonomy given to national regulators to decide which markets are competitive and which operators have significant market power will lead to distortions in the market. Under the proposals the Commission intends to guard against this by allocating itself a coordinating and supervising role to ensure coherent application of the rules. However Member States seem keen to limit the Commission's powers of intervention. This is a concern since an uneven application of the rules will complicate the roll out of pan-European m-commerce service. The new framework was proposed by the Commission in July 2000 and is currently being discussed by Member States and the European Parliament.

### 1.10 Competition Policy and The Mobile Sector

34. In addition to the detailed sector specific regulation on telecom, national and EU competition law also applies. The recently published **6<sup>th</sup> Implementation report<sup>16</sup>** on telecom regulation highlighted the high prices charged for roaming services in the mobile sector – there was a substantial increase in wholesale roaming prices between 1997 and 2000. The European Commission is considering possible solutions to excessive roaming costs as well as guidelines on the application of competition rules to issues such as joint dominance, market definitions and non-discrimination obligations.

### 1.11 Third Generation

35. The **UMTS Decision<sup>17</sup>** called upon Member States to ensure the coordinated and progressive introduction of 3G services on their territory by 1 January 2002. That timetable is looking increasingly unlikely with some industry sources suggested that some of the key 3G technology may not be marketable before 2004. At the time of writing the Commission is preparing a report highlighting one option for operators – namely the roll out of money spinning applications on GPRS enhanced networks to finance the necessary 3G investments.
36. Operators have strongly criticized the uneven 3G licensing procedures across Member States. Some countries used a comparative selection process, some a competitive bidding process, and others a two-stage mixture of both. The EU's Licensing and Mobile Directives allow Member States discretion in license allocation as long as certain principles are respected: objectivity, non-discrimination, proportionality and transparency. Indeed the Commission is gathering information following complaints regarding the transparency of some auctions.

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<sup>16</sup> Sixth Report on the Implementation of the Telecoms Regulatory Package  
<http://europa.eu.int/ISPO/infosoc/telecompolicy/6threport.html>

<sup>17</sup> Decision 128/1999 on the introduction of 3G  
[http://europa.eu.int/eur-lex/en/lif/dat/1999/en\\_399D0128.html](http://europa.eu.int/eur-lex/en/lif/dat/1999/en_399D0128.html)

37. Otherwise the Commission's hands are tied unless there is a cross-border competition angle. It has stated that it will study the results of the licensing procedure as a whole once the final licenses are awarded in mid 2001, which could have implications for the way in which 4G licenses are awarded.
38. As part of its reform package for the telecom sector the Commission has also proposed a **Decision on Radio Spectrum**<sup>18</sup> with a view to ensuring the harmonized availability and efficient use of radio spectrum. Clearly decisions on spectrum allocation have major economic and strategic importance as borne out by the recent 3G auctions. The Commission argues that better account should be taken within the institutional arrangements for radio spectrum allocation (managed by the European Conference of Postal and Telecommunications administrations -CEPT) of EU business and user needs.
39. Clearly the high cost of securing 3G licenses could impact negatively on the investment of some operators in the roll out of the necessary infrastructure. The subsequent delays would negatively the implementation of business strategies based on value-added m-commerce services. The European Commission is concerned but unable to do much in the current circumstances. Member States have indicated in their response to the proposed Spectrum Decision (38) that they have little intention of allowing the Commission a bigger say in how spectrum is allocated. From a more positive perspective there are those who argue that 3G infrastructure and services will be rolled out more quickly since operators are keen to start generating the revenues to cover their license costs.

## 1.12 Conclusion

40. The EU's efforts to create a predictable regulatory framework for on line business and electronic communications are a welcome boost to a sector racked by uncertainty. Everyone believes m-commerce is set to grow in the EU but there is uncertainty over how quickly revenues for m-commerce services will take off, what applications consumers will want and how much they will be willing to pay for them. EU regulatory developments with regard to unsolicited marketing and location services need to be followed closely while initiatives to boost on-line payment, on-line consumer confidence and on-line financial services are to be fully supported. For further details on all issues raised in this paper please do not hesitate to contact the Commercial Service at the United States Mission to the European Union at [Brussels.ec.office.box@mail.doc.gov](mailto:Brussels.ec.office.box@mail.doc.gov)

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<sup>18</sup> Proposal for a Decision on a regulatory framework for radio spectrum policy <http://europa.eu.int/ISPO/spectrumgp/sgptxt/specdece.pdf>

## 2 Austria

### 2.1 Summary

This report deals with m-commerce, or mobile e-commerce, the extension of electronic commerce beyond the limitations of the PC or TV as access devices. It can be defined as the use of a terminal such as a cellular phone or PDA (Personal Digital Assistant) like a Palm Pilot, and the public mobile network to access information and conduct transactions that result in the transfer of value in exchange for information, services or goods. Simply put, m-commerce is the ability to interact and transact with anyone, anytime and anywhere.

Liberalization and new competition in the Austrian telecom sector has led to decreased prices and increased services. The fastest growing market segment is the mobile phone market. Austria is one of the user-friendliest countries in Europe in the field of mobile phones with growth rates over 100 percent for the last two years. Market penetration is more than 60 percent and is forecasted to amount to 70 percent in the first half of 2001. Especially the use of SMS (Short Messaging Service) has exploded in the past two years. There are four mobile network operators on the Austrian market. Mobilkom Austria, a subsidiary of Telekom Austria, the former monopolist, remains the market leader, followed by max.mobil, Connect Austria (also known as "One", the name of their network) and tele.ring. All four operators launched WAP (Wireless Application Protocol) services last year, however, take-up has been slow. The high costs and slow speeds, inconvenient navigation and small keyboards frustrate consumers.

The new GSM standard GPRS (General Packet Radio Service), a high-speed service which offers an "always on" connection, was recently introduced by Mobilkom Austria and Tele.ring. The lack of GPRS enabled handsets on the market, however, is hampering the quick adoption of this technology.

Despite the high mobile market penetration, m-commerce is in an early state of development. Common criticisms include slow speeds, limited functionality and a limited range of content and, in addition, high initial costs and operating fees. Moreover, there is broad concern about privacy and security. A significant numbers of users are not willing to send credit card information and other personal details from their mobile phones.

### 2.2 Market Overview

In Austria, the mobile phone market is the part of telecommunications that is developing most dynamically and, also by international comparison, has turned into a remarkable success story. While the market volume in 1997 was \$ 513 million, it increased to \$ 773 million in 1998 and \$ 1.1 billion in 1999. Figures for 2000 are not available yet. At present, mobile phone penetration is about 63 percent with more than 5 million Austrians using cellular phones. Mobile phone operators are heavily subsidizing handset sales, that are available for free, or, depending on the model, for a bargain of \$8 - \$100, combined with a subscription for one year. The number of mobile devices able to access the Internet will exceed the number of PCs by 2003.

Until very recently, the Austrian m-commerce market was stymied due to a lack of intelligent devices, applications and contents. Although over the last few months, some of these disabling factors have been removed, barriers to adoption remain. There are now several brands of WAP-enabled phones on the market, however take-up has been slow. Consumers are frustrated by the slow and more cumbersome mobile surfing compared to the speed and functionality of surfing the Net on a PC. As technologies and applications improve, more and more people will become subscribers.

The number of subscribers will also climb as mobile's special strengths - particularly those that foster personalization, location based services, and the integration of online shopping- become more widely known and appreciated.

### 2.2.1 Applications

In recent months, the following applications have been introduced to the Austrian market:

#### 2.2.1.1 *Location Based Services*

Localization of services and applications adds significant value to mobile devices. Knowing where the user is physically located at any particular moment is the key to offering relevant services that will drive users towards transacting on the network. Mobile operators know where a customer using their networks is located. WAP-enabled handsets offer real-time location information using global positioning technology. Operators exploit this knowledge to target services specific to a user's location. Information and directions to the nearest gas station and navigational services to help avoid traffic congestion are two examples of location-based applications.

Mobilkom Austria was the first mobile operator in Europe to introduce location based services and offers its subscribers a selection of the following service categories: food & drink, culture & entertainment, life & style, travel & tourism, sport & wellness, household & shopping, health and doctors, automotive, emergencies & help, finances and house & garden. The remaining three mobile operators plan to introduce location based services later this year. This kind of service will become one of the major applications of m-commerce and its use is expected to grow, increasing profits for involved companies.

#### 2.2.1.2 *Mobile Banking*

All larger banks offer mobile Banking. The motivation for mobile banking from the bank's perspective is to have an additional distribution channel and to further cut costs. Most often used services include checking account and credit card balances, transferring funds, and paying invoices.

#### 2.2.1.3 *Mobile Payment*

Solving the payment issue in m-commerce is the key for the future uptake of the industry. So far no standards have emerged, but, for the time being, it seems most feasible to use existing payment methods such as credit cards, direct debit, etc. A race involving credit card companies, banks, mobile operators and start-ups is currently underway. Each of them is trying to leverage its customer base or technical capabilities to build a critical mass of users and establish its payment system. Paybox, a German start-up half-owned by Deutsche Bank, is staking out its claims in Austria. By entering their personal codes into their phones, Paybox customers can pay for taxi rides, restaurant meals and other services.

#### *2.2.1.4 Mobile Shopping*

Mobile Shopping is in its infancy. Consumers can order pizza, flowers, railway tickets, theatre and movie tickets as well as electric and electronic devices from a leading Austrian chain store. It is expected, however, that there will be a large space for e-retailers to become m-retailers when the personalization and location issues are well addressed. Books, CDs, and groceries are often items which the user knows well and where he needs just a tool to make a purchase. The purchase will be made when the user has spare time independently of the shop opening hours and the physical location.

#### *2.2.1.5 Information*

At present the capabilities of "surfing" the Internet and finding information via WAP are limited. This is due to low bandwidth, small handset screens and basic application protocol. It is forecast that all these problems will be solved over the period when 3G technology increases the bandwidth availability leading to a huge increase in usability of the wireless web. The following information categories are offered today:

News, Train Schedules, Yellow Pages, Map of Europe, Dictionaries, Weather, Public Transportation, Austrian Tourism Information, Recipes, Stock Information, Partner Search, Horoscope and Jobs.

#### *2.2.1.6 Entertainment*

All four mobile operators offer entertainment. Interactive online games and online gambling are well received by young people. Highlight of the last weeks was MoneyMania, an economic game where players establish virtual companies and defend them against other players. The best managers won prizes sponsored by the network operator. Other games include Teamleader, a soccer game, and, unbelievable but true, a strip quiz and a love calculator. The latest feature is to play the lottery by mobile phone.

### 2.2.2 Market Drivers

There are a number of drivers to the evolution of m-commerce. In addition to the explosive growth of both the Internet and mobile telephony, there is a general search for new business opportunities. Today we see an entirely new market emerging - the web economy, an economy which reaches far beyond the net. New partnership networks, everything that shortens the time to market and increases the speed of a transaction, will be driving economic forces in the future. With mobile communications reaching the mass market, network operators are facing decreasing revenues. The rate of price erosion for mobile voice service speeded up when the fourth mobile operator entered the Austrian market last year. Network operators must continuously implement new services on their networks to turn around the trend of decreasing sales figures. M-commerce is the strongest future potential source of revenues for operators. In addition, the push from equipment vendors for WAP gateways and microbrowser-enabled smartphones is helping to drive the market for m-commerce.

### 2.2.3 Market Obstacles

The evolution of m-commerce is not without barriers. Privacy and security are chief concerns that may hamper the use of location-based and shopping services that operators are counting on to turn a profit. A significant portion of users are reluctant to send credit card numbers and other personal details from their mobile phones. The growth of m-commerce must build a harmonious relationship between seller, buyer, financial institution and service provider. Confidence in all the parties involved in the transaction and in the technology that stands behind it must be built up.

Presently, initial costs and operating fees are high. Most users want low flat fees, which are a staple of the fixed-lined Internet. Consumers' priorities are to communicate more effectively and save time. They are not satisfied with mobile applications in these key areas: speed, ease of typing in text, and ease of navigation.

Many companies and institutions are locked into conventional thinking. Many stand at somewhat rigid boundaries that have traditionally separated industries in Austria; for example, a bank may be reluctant to enter partnerships with less traditional institutions.

### 2.2.4 Key Players

#### 2.2.4.1 *Network Operators:*

There are four mobile phone operators on the Austrian market. Market leader is Mobilkom Austria, a subsidiary of Telekom Austria, the former monopolist. Majority holder of Mobilkom is the Austrian State, a 25 % share is held by the Italian STET. Mobilkom has presently 2.8 million subscribers and holds a market share of 45 %. Competitors are max.mobil, majority-owned by Deutsche Telekom with 2.1 million subscribers and a market share of 36 %, Connect Austria, owned by EON (former VIAG), Telenor, Orange and Tele Danmark) with 1.3 million subscribers and a market share of 19 % and Tele.ring, 100 percent owned by the British Vodaphone, who started operations only last year and has presently about 150,000 subscribers. All four operators have seen impressive growth in subscriptions on the back of falling call charges and improved network coverage.

#### 2.2.4.2 *Handset Manufacturers:*

Handset manufacturers have become increasingly important in the value chain. Generally, consumers do not care for a particular network operator, but rather for the handset brand. The emergence of the mobile phone as not only a consumer electronic device, but also as something personal such as a pen or watch, has created lots of value for the handset brands. In m-commerce, there is a bottleneck in bringing new devices to the market that support not only SIM (Subscriber Identification Module) Toolkit, but more importantly WAP and GPRS. Innovation cycles are becoming continuously shorter, but significant m-commerce will not take place before the right end-user terminals are widely available. Handset manufacturers have to develop a wider variety of products, as future applications will require different combinations of features. Handsets, optimized for music download and listening, video streaming and watching, computing, game playing or just managing one's life will become possible choices.

At present, the Austrian market offers a multitude of different handset brands, about half of which is WAP enabled. The first GPRS handset, the Motorola T260, was introduced last month. Other models from Ericsson, Samsung, Sagem, Panasonic and Mitsubishi are expected to appear on the Austrian market within the coming months.

Main suppliers of handsets and PDA's include: Nokia, Ericsson, Motorola, Siemens, Alcatel, Palm Inc., Hewlett Packard and Compaq.

#### 2.2.4.3 *Content Providers:*

Content providers bring the substance to the Internet. This content covers a wide variety of topics such as generic information, news, weather, Yellow Pages, stocks, personal financial information, etc. In the B2B environment, content providers are the companies selling their goods and services. The main content providers in Austria include Austrian Railways, Austrian Federal Theatres, ORF (the National Radio and TV station), Der Standard (a daily newspaper), and the largest Austrian banks Bank Austria, Creditanstalt, Bawag and Raiffeisen Landesbank.

#### 2.2.5 Regulatory Framework

Regulation is the responsibility of the Telecom Control GmbH, which was set up as independent agency, supervised by the Ministry for Transport, Innovation and Technology. This agency plays a crucial role in making the liberalized market function properly. It is in charge of:

- granting licenses and assigning and supervising frequencies;
- ensuring fair and effective competition in the telecommunications market;
- promoting market entry by new providers;
- ending or preventing exploitation of a dominant position in the market by any operator;
- ensuring compliance with the principles of open network access;
- adopting the sector-specific competition regulations of the EU and adapting them to the local market;
- arbitrating in disputes between market participants, as well as between market participants and users.

Telekom Control maintains its own website ([www.tkc.at](http://www.tkc.at)) which offers information on the agency, listings of all license holders, press releases and current regulation issues.

### 2.3 **M-Commerce Technologies**

#### 2.3.1 Network Technologies

##### 2.3.1.1 *GSM*

GSM (Global System for Mobile Communications) was established in Austria in 1996. It operates in the 900 Mhz and the 1800 Mhz frequency band and is the prevailing mobile standard in Europe.

##### 2.3.1.2 *GPRS*

The new GSM standard GPRS (General Packet Radio Service), a high-speed service which offers instant access to data networks, is now beginning to take off. Mobilkom was the first in Austria to launch this technology, followed by Tele.ring. max.mobil and Connect Austria are rushing to start trial programs. This technology may revolutionize the way mobile medium is used from how it was used in the past. The advantage of GPRS is that it provides an "always on" connection between the mobile terminal and the network. It is the first transport mode to allow full instant mobile Internet access and will become the enabler for a wide range of applications. In this sense it truly may pave the way for 3G (Third Generation) UMTS technology. GPRS requires new terminals that support the higher data rates, and this seems to be the bottleneck to consumer acceptance of the technology. So far only one handset model has been released. "Launching" a technology should mean that a consumer can go to any cellular shop, choose

between a multitude of models and buy the one he likes best. With the market appearance of new handset models, operators expect growth at aggressive rates.

### *2.3.1.3 3G*

3rd generation (3G) is the generic term for the next big step in mobile technology development. UMTS (Universal Mobile Telephone System) is the third generation mobile phone system that promises to provide a bundle of Internet-enabled mobile services- everything from instant messaging and video games to alerts and reminder- as well as myriad forms of personalized and location-specific commerce. UMTS will be commercially available starting 2002 in Austria.

In November 2000, six licenses for 3G mobile telephony were awarded to the four Austrian operators Mobikom, max.mobil, Connect Austria and Tele.ring, as well to the Spanish Telefonica and the Chinese Hutchinson. Total revenue from the auction was only \$ 760 million, far below what the Finance Minister had expected. The bidders seem to have learned the lessons of moderation from the British and German auctions. Austrian consumers seem to be the real winners of this 3G auction.

HSCSD (High Speed Circuit Switched Data), a circuit switched protocol based on GSM, as well as EDGE (Enhanced Data Rates for Global Evolution), a higher bandwidth version of GPRS are currently not available in Austria. Bluetooth technology which will make it possible to separate the transceiver unit of the mobile phone from the earpiece and the display is also not yet available.

## *2.3.2 Service Technologies*

### *2.3.2.1 SMS*

For several years, SMS (Short Message Service) has provided the possibility to send and receive text messages to and from mobile phones. Each message can contain up to 160 alphanumeric characters. During 1999 and 2000, SMS became hugely popular. Especially users between 15-25 years use their handsets for text messages more often than for voice calls.

### *2.3.2.2 WAP*

WAP (Wireless Application Protocol) is a global standard for mobile solutions, including connecting mobile terminals to the Internet. The advantage of WAP is that it makes it easy and user friendly to receive and react to information on the mobile phone. WAP is expected to lift the entire area of mobile information services to a new plane which the SMS world is only a poor approximation. WAP has been able to gain support from all major players in the market. WAP based information is also optimized for GPRS, so that the transition to the "always on mode" is expected to be smooth. However, some industry analysts feel that WAP is only a temporary solution for achieving Internet access using mobile phones. They predict a different technology based on the HTML standard will eventually replace WAP in providing high-speed Internet access.



Austrian operators have launched WAP services as a prelude to the implementation of GPRS. However, despite the boom in mobile phone usage in recent years, take-up of WAP phones has been slow. Although launched about a year ago with great fanfare, only one in ten mobile users strayed into the WAP world so far. The reason is no longer that not enough WAP terminals are available - half of all mobile phones on the market are WAP enabled. The top consumer complaints about WAP include: high costs, slow speeds, cumbersome navigation and the difficulty of typing text using a small phone keypad.

## **2.4 Competitive Analysis and Market Opportunities**

There is fierce competition among the Austrian mobile network operators that is driving down prices and driving up quality. With mobile communications reaching the mass market, network operators are facing decreasing ARPU (Average Revenue Per User). Price erosion for mobile voice service has increased with the 3<sup>rd</sup> and 4<sup>th</sup> mobile operator having entered the market.

All four Austrian mobile operators are now building portals, mainly with third party data from existing portals or content feeds. They are not experienced on the content side, but they have been capturing subscriber data. They have several advantages over other portal players including existing billing relationship, substantial, verified subscriber data, and knowledge of subscriber location. Mobilkom Austria could hold its leading position by the introduction of location based services.

Market opportunities for enabling technology, applications and digital content are small at present, but are expected to grow explosively over the next several years. Middleware platform products will link existing enterprise information to WAP-enabled services. There will be a strong demand for WAP servers and gateways. Encryption and security technology is likely to benefit from the expected mobile commerce wave. Mobile entertainment solution vendors will be successful, as end-users use their mobile phones as personalized entertainment centers.

All four Austrian mobile operators are actively developing and deploying next generation mobile networks and betting on the future success of mobile Internet applications. They expect to be able to introduce UMTS services in the second half of 2002. Building up UMTS infrastructure will require enormous investments. This opens up large opportunities for suppliers of UMTS architecture, network design, systems, software and equipment. None of the operators has announced yet the selection of technology or equipment suppliers. It can be expected that multinational enterprises such as Siemens, Motorola, Lucent, Nokia, Alcatel who are already active on the Austrian market will be contracted, however, there will also be opportunities for competitive niche products.

## **2.5 Statistical Information**

There are no figures or estimates on the Austrian m-commerce market available. According to Austrian market researcher Legend, commercial transactions carried out over mobile phones in Austria are forecasted to amount to Euro 708 million (about \$ 637.2 million) in 2003. Compared to other European countries i.e. Germany (Euro 4.2 billion), Italy (Euro 4.5 billion) and UK (Euro 3.5 billion), Austria holds a leading position with respect to its population.

## **2.6 Contact Information**

### **2.6.1 Mobile Network Operators**

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### **2.6.2 Government Contacts**

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Internet: <http://www.aba.gv.at>  
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Austrian standards for telecommunications equipment can be obtained from the following institutes:

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(Austrian Institute of Standards)  
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A-1020 Vienna  
Tel.: 43/1/21300-805  
Fax: 43/1/21300-818  
E-mail: [sales@on-norm.at](mailto:sales@on-norm.at)  
Internet: <http://www.on-norm.at>

### 2.6.3 Associations

Verband Alternativer Netzbetreiber (VAT)  
(Association of Alternative Network Operators)  
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#### 2.6.4 U.S. Embassy Contacts

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### 3 Belarus

M-commerce market in Belarus finds itself at present at its nascent stage only. Very few applications and industry sectors have been already involved.

#### 3.1 **Market Overview**

##### 3.1.1 Communication

Major means of telecommunications utilized in Belarus at present include e-mail, fax, regular phone, NMT-450 and GSM-900. SMS is not available

##### 3.1.2 Infotainment

There are 10 to 100 web sites in the each category, that have information on travel, advertising, interest clubs, finance, etc. Also, there are approximately 100 Internet stores mostly grouped under [www.shop.by](http://www.shop.by)

##### 3.1.3 Lifestyle facilitators

Only simple e-mail security measures, including digital certificates are employed.

##### 3.1.4 Transactions:

Mobile banking is non-existent. Currently, several companies are developing Internet Banking Solution, which will include mobile banking. Telemetry has been utilized in the national economy for quite a while.

### **3.2 M-commerce market opportunities.**

M-commerce market is largely undeveloped and is potentially wide open to new technologies. However, major obstacles to this arise from government monopoly on Belarus' telecommunications sector. For example, all existing Internet connections in Belarus with the total capacity of approximately 16 Mbite/sec are exercised through Belpak, organization belonging to Beltelecom, the government monopoly telecommunications operator in Belarus. All other commercial Internet providers in Belarus have to work through Belpak's transmitter without any alternative. Additionally, by local standards, Belarussian users have to pay extremely high prices for access to Internet.

At present, there is only one GSM mobile phone services provider in Belarus. The company Velcom ([www.velcom.by](http://www.velcom.by)) currently has 38 thousand users and offers only patchy coverage of the country. (N.B. Belarus' population is 10 million)

### **3.3 M-commerce technologies**

The m-commerce instruments currently available in Belarus include:

- GSM
- PDAs
- Mobile/wireless link with mobile PCs
- Radio-Ethernet networks.

### **3.4 Competitive analysis**

The government of Belarus plans to issue another license for GSM operations in April 2001. If happens, this will stop Velcom's three-year monopoly and will hopefully expand chances for m-commerce.

Potentially, U.S. companies have good opportunities on the local market, given the inadequacy of telecommunications services to household and business needs. However, the economic policies that the Government of Belarus pursues currently undermine protection of foreign investment.

### 3.5 Statistical information

At present, there are two cell phone services providers:

- Belcel (NMT-450) - 17 thousand users;
- Velcom (GSM-900) - 38 thousand users.

There are six PDA services providers in Belarus with the total of 20 thousand users.

### 3.6 Contact information

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#### 3.6.1 Internet Providers in Belarus

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## 4 Belgium

### 4.1 Summary

The development of m-commerce in Belgium is due in large part to Proximus (a SBC affiliate), Mobistar, and Orange, the three major mobile telecom operators. Their integration of Wireless Application Protocol (WAP) technology has been crucial to the accessibility of m-commerce applications. In the closely related mobile manufacturing market, Ericsson, Siemens, and Nokia have been the principle innovators of WAP-enabled devices and are also developing the new handsets required for General Packet Radio Service (GPRS) technology.

The mobile Internet market is young and potentially explosive for early investors. However, during the past year, Belgians have not been particularly interested in the new applications and increased costs of m-commerce technology. The eventual market driver of m-commerce will be the availability of infrastructure, handsets, and applications necessary for GPRS and Universal Mobile Telecommunications System (UMTS) technologies.

Partnerships between mobile manufacturers, financial and professional service companies, Internet Service Providers (ISP), and e-business developers are playing a crucial role in the development of current WAP technologies. However, the young m-commerce market has many barriers to overcome. From slow Internet access via mobile phones to mistrust of security in mobile banking, many solutions will be needed in the years ahead. Important foreign players in m-commerce include DoCoMo of Japan and Unitronics of Israel.

### 4.2 M-commerce and the Mobile Telecom Operators

The key players of the m-commerce revolution in Belgium are the mobile telecom operators; Proximus (Belgacom Mobile, 49% owned by SBC of the U.S.), Mobistar, and Orange. The first data service available on mobile phones was the Short Message Service (SMS). Proximus, Mobistar, Orange, and all ISPs currently offer this service, usually at no extra charge to the customer. Currently, the mobile operators also have their own WAP portals and have offered Internet services by mobile phone since the spring of 2000.



Voice communications continue to provide the most revenue in the mobile market. However, SMS is the most-used application of mobile technologies, and email has proved to be popular for WAP users.

#### 4.2.1 Proximus (Belgacom Mobile)

Proximus, the market leader in Belgium, had a market share of around 58% and over 100,000 WAP users by the end of 2000. WAP applications available via Proximus Inter@active include traffic help, flight information at Zaventem, Belgacom white pages, Promedia yellow pages, news, financial information, sports, weather, leisure, and a function called scoot (a sort of compass for visitors in Belgium). There is no additional fee for users of WAP; the client pays only the standard telecom tariff per minute.

The Proximus network is positioning itself to take advantage of GPRS technology, whose implementation will be possible due to remote LAN connectivity. The system includes a three-second connection (elimination of dial ups), a higher throughput by using multiple channels, the possibility for more than one user to occupy a single channel, an IP-based network, and charges based on data rather than time consumption.

#### 4.2.2 Mobistar

During the year 2000, Mobistar reportedly increased its clientele by 73%. Due to this growth, the company holds 32.7% of the mobile market that now touches 54% of the Belgian population. WAP has been available through the network since April of 2000, and the services offered are similar to those of Proximus. However, other elements available include the e-mail manager, a stock exchange service, and a WAP site publisher in connection with Tout'Ouie (a WAP content developer). The installation of WAP for Mobistar users is free of charge, however all minutes not included in their general subscription will cost 4,16 BEF per minute.

Mobistar was the first Belgian company, and one of the firsts in Europe, to innovate a pre-paid calling card for WAP access. The Tempo card consequently offers WAP access and SMS service since its introduction in the fall of 2000. When using Tempo for WAP purposes, the cost is 5 BEF per minute.

In early 2001, Mobistar announced a WAP solution destined for companies. The Pocket Office is an application providing access through a WAP device to a Microsoft Exchange server on the Intranet network of a company. Users are able to use the e-mail, agenda, address book, and to-do list associated with Microsoft Exchange. Linq (IT solutions company) will provide the software solution, and Telindus and Siemens Business Services shall be the integrators of this system. Available in March 2001, this program awaits the launch of more efficient GPRS and EDGE technology. Mobistar claims that the integration of GPRS will be simple; no additions will be required for their existing network. Advantages of GPRS and EDGE (2.5G technologies) for the subscriber are similar to those of Proximus, although Mobistar includes a global roaming feature. The required handsets are on the market, but they will not be available to all dealers in 2001.

#### 4.2.3 KPN Orange

KPN Orange offers similar services to those of its competitors in the information, financial, and entertainment applications. Besides the set amount of 2 BEF paid for every call, the Orange customer does not pay any subscription fee to access Orange "WAP Info Connection." All

services are available for a flat fee of 6 BEF per minute with My Talk or Business Talk and 8 BEF per minute with PrePay.

In September 2000, KPN Orange launched HSCSD (High Speed Circuit Switched Data) and announced the introduction of GPRS for 2001. KPN Orange is the first operator in Belgium to offer both complementary and innovative technologies to its customers. With HSCSD, Orange is offering a data transmission speed of 28.8 Kb/second. The company believes that HSCSD is the first step to a real mobile office, which accesses text and information services, Internet, static and moving images, e-mail, and multimedia. With HSCSD, receiving and sending of E-mail is reportedly much faster, as with downloading Internet pages. Therefore, communication costs are less, because the information is transmitted faster.

#### **4.3 The Mobile Market in Belgium**

In the end of 2000, the mobile market penetration percentage in Belgium was around 54%. Despite increasing sales, mobile usage in Belgium is relatively low at 31%. Siemens benefits from a dominant position as a system developer and integrator in Belgium and has produced innovative WAP-enabled handsets. Nokia's reputation allows it to remain a prominent supplier of mobile phones in the country, and their Internet Communications unit is growing faster than any other branch of the company. Ericsson, the global leader in communications, also plays a key role, supplying everything from systems to applications to mobile phones. Ericsson has created its own "WISE portal" to ensure rapid end-user acceptance of mobile Internet services that are user-friendly and personalized.

Current WAP users in Belgium can choose from the Motorola Talkabout T2288, Motorola Timeport P7389, Motorola T250, Ericsson R320, Ericsson R380, Nokia 7110, Nokia 6210, Siemens SL45, Siemens C35i, Siemens S35i, Siemens M35i, Alcatel 501, Alcatel 701, Alcatel 301, Alcatel 302, Alcatel 303, Panasonic GD93, and Trium Mitsubishi Mars. These instruments are all compatible with the Proximus and Mobistar networks because of their dual 900 and 1800 MHz standards, but not all are compatible with the Orange network as it uses only 1800 MHz.

#### **4.4 Market Overview**

An Arthur Andersen/JP Morgan study predicts that by 2010, the European wireless data market will be worth \$82 billion. The m-commerce market is now up for grabs and has the potential to create much visibility for its pioneers. The first companies to invest in wireless technologies will find themselves in a "winner take all" situation, that is, if these technologies prove successful.

Despite the promise of this explosive market, European mobile and PDA users have been reluctant to accept and/or use consistently applications of m-commerce. Therefore, interested entrepreneurs must take into account the hypersensitive and sometimes overestimated character of this market. Basically, WAP was over-promoted and did not fulfill its promises during the past year.

Ready.be, the e-commerce arm of the GB supermarket chain, encountered problems because it did not attract the Internet and WAP-users that it was expecting. Changing consumers' habits has proven to be more difficult than expected, which is still generally a problem for e-commerce. If there continues to be little Interest in WAP technologies in Belgium during the next year, GPRS and EDGE technologies will continue to experience delays of implementation, and UMTS integration may not be possible in 2003.

The ISP Planet Internet says broadband access is interesting in itself because it makes access to websites much more comfortable. However, broadband users are predicted to be less than 25% of all Internet users by the end of 2001. Another problem for GSM operators in Belgium is the dramatic shortage of trained IT personnel needed to develop the new medium. In addition, the reason for switching to broadband for most mobile users was not for the technology itself, but for the one-bill convenience.

#### 4.4.1 Market Drivers

The market drivers of m-commerce will be availability of the infrastructure, handsets, and applications for GPRS and EDGE, the future of UMTS technology, and the targeted customers' willingness to use these technologies and applications.

#### 4.4.2 Infrastructure, Equipment, and Applications

Currently, Proximus, Mobistar, and Orange operate 2G mobile networks (900/1800 MHz), and the upgrades to GPRS and EDGE are in end stages of development. Based on preliminary test results during 2000, Proximus and Mobistar expect the launch of GPRS on their networks in 2001. The technology will facilitate a more complete convergence between the GSM network and the Internet, making all Internet applications available to mobile phones. In order to enjoy these advantages, users will need new GPRS handsets, access to the GPRS services of their operators, and special applications developed by third parties.

Increasingly attractive and efficient m-commerce activity will be available when the Third Generation (UMTS) networks will be operational. In February 2001, 3G licenses were granted to three Belgian candidates. Proximus, Mobistar, and Orange are expected to make their networks operational by 2003. Arthur Anderson and JP Morgan predict that Belgium will possess one of the most advanced wireless data markets along with its northern European neighbors. Belgium has enjoyed high wireless and Internet penetration as well as income distribution in these markets compared to the rest of the European Union.

#### 4.4.3 Targeted Consumers

Due to the costs of upgraded bandwidths and other related applications, the early adopters of m-commerce are likely to be business users. In addition, the services now available on-line are naturally the most useful for the businessperson on the go. Consequently, network operators that have a greater proportion of business customers have the first-user advantage of the system. Another target market is the under-25 age group. These are the customers and users of the future and capturing this market will require youth-oriented brands.

#### 4.4.4 The Important Role of Partnerships

The backbone of m-commerce is made up of special partnerships between competence centers and companies developing front-end and back-end technological solutions. At present, new

foundations are being laid by the interaction of prominent financial and professional service companies, e-business developers, mobile equipment manufacturers, and ISPs.

An example of such a partnership is that of PriceWaterhouseCoopers, Evisor, and Financial Architects. The SMS and WAP capabilities of Evisor, the voice technology solutions of Financial Architects, and the process and industry knowledge of PriceWaterhouseCoopers have developed a mobile banking and trading solution via multi-channels. With Multi-Channel Mobile Banking, a client can instruct his bank using a voice activated mechanism, SMS, Internet, or PDA to transfer funds from one account to another, to buy stocks, or to draw an overview of his current portfolio. This type of integrated solution provides convenience for the client, easy accessibility between banks and customers, user-friendliness, modular components, security, flexibility of technology upgrades, and cost efficiency for the banks and trading houses.

Evisor is also associated with Avantgo, an American specialist of mobile Internet access. Avantgo has granted Evisor a license for its “enterprise Interactive-technology,” through which the Belgian company can extend its Internet services and applications to users of MS Pocket PC, PDAs, and mobile phones.

Traditional operators are changing their strategies for the integration of m-commerce. Establishing a portal is one option; the other is to form a partnership with an existing portal in order to secure a relation with the end-user. A likely result is horizontal consolidation through partnerships and acquisitions. An example of this type of consolidation between operator and application service provider is that of Nokia and Visa, who have partnered in order to provide m-commerce payment facilities.

As of February 15, 2001, Ericsson and IBM have formed a partnership to help financial services companies deliver mobile Internet offerings that enable high-value, high-volume Business-to-Consumer (B2C) services such as wealth management, account aggregation, mobile trading, and credit card and payment alerts. The aim is to give financial institutions a standard, highly scalable, and secure end-to-end infrastructure for implementing robust services across multiple financial channels.

Yet another example of partnership is that of the Belgian company iWAP with Zanussi, Orange, Ericsson, and Cellutions Ltd. iWAP is aiming to create practical development applications for WAP-enabled devices. These applications include payment of products delivered by distributors (such as vending machines and car parks), tools for human resource planning, a specialized agenda and task list, and a number of virtual wallet applications allowing the command of goods and services from participating businesses. iWAP is an early-stage m-commerce initiative; its users can command products through a WAP device, but the company has yet to develop methods of payment via Internet.

#### 4.4.5 Mobile Banking in Belgium

According to Mobistar executives, one in twelve Belgians use telephone banking, affirming the possibilities of mobile banking. Dexia is developing a mobile banking project for its customers. This system will allow the customer to take care of all banking transactions through a mobile device. The cost of using this technology will be the same as making a local call. At this stage, all new subscriptions will be free of charge. In addition, all new functions are automatically upgraded in the system; therefore the client will always benefit from the latest version of the application. As for security, the WAP-enabled device and the portal will be encrypted with 128bit Wireless Transport Layer Security (WTLS). Once connected to the network, the Net Banking security system with RSA and triple DES will be in place. KBC, another Belgian bank, is developing a similar mobile banking system.

#### 4.4.6 Market Obstacles

The disadvantages of mobile commerce include today's slow access to the Internet via mobile phones and PDAs, less attractive WAP sites, additional costs of the system, lack of user interest in new applications, general mistrust of security, and the lack of handsets, applications, and services for GPRS and EDGE technologies. The main GSM operators of Belgium and prominent equipment manufacturers will probably not admit the failures of WAP during its first year. Reportedly, only 4% of Internet surfers have a WAP device, and only 2% of these have actually used WAP applications. Foreign surveys confirm similar results in their markets.

The first clear disadvantage of WAP technology is slow access to the Internet through the use of mobile phones and PDAs. This problem will supposedly be resolved with the implementation of GPRS and EDGE, and eventually UMTS, but the lack of success of WAP during its first year is a setback for the introduction of speedier technologies.

Another problem is the fact that mobile-Internet does not resemble the Internet as accessed from a PC. For one thing, it lacks images and multimedia applications. The Internet was designed for computers equipped with relatively large screens and very sophisticated software, whereas WAP sites can usually only contain text due to their small black and white screens, limited range of characters, low transmission speed, and little internal memory. Images can be produced on m-commerce gadgets, but usually only in black and white and picture size is naturally reduced and of lesser quality.

The cost of WAP use can be a deterrent for potential users as they might see less utility in purchasing a special handset/PDA and a subscription when they already possess an Internet connection at home or work. A WAP subscription on the Proximus network is set at 10 BEF per minute. This sum may seem reasonable to some, but coupled with the slow connection time, this is not acceptable for most customers. According to a Forrester Research survey, when asked what they would change about mobile Internet services, an overwhelming majority of users said they would lower the cost. Looking ahead, the investments and license fees required for UMTS technology are a definite market obstacle. Belgian mobile telecom operators will each pay a minimum of six billion BEF towards their licenses in March 2001, which is considerably less expensive than the fees required in Germany and the UK. Siemens has predicted that some mobile firms will collapse under the weight of these 3G license fees and operators who consequently demand heavy financing agreements. One U.S. telecom consultant estimates that globally, cellular carriers will have to double their average revenue per subscriber by 2004 in order to cover the costs of 3G licenses and hardware.

For the moment, the average mobile phone user is mostly interested in voice and SMS communications. A Forrester Research project conducted in the end of 2000 showed that mobile phone users surveyed were not interested in the new mobile Internet applications. Downloading music, managing bank accounts, gambling, playing online games, accessing telephone directories, and traffic information were not viewed as practical or necessary by the mobile subscriber.

Another concern for WAP and e-commerce technologies is the security of transactions because there is now greater need to protect back office information consulted or retrieved either within or outside a company. The Proximus network and the company GlobalSign are offering WTLS encryption which implements authenticity and coding options for the mobile environment. GlobalSign's new product MobileSign™ can be installed on major WAP servers and offers to protect confidential information such as credit card numbers, online forms, and other financial data.

At present, the lack of availability of handsets, applications, and services for GPRS and EDGE technologies is also a major setback for m-commerce. Additionally, studies of GPRS instruments show that they will not function as rapidly as promised.

A general lack of enthusiasm of Belgian mobile-users has delayed the implementation of these technologies and thus the introduction of GPRS/EDGE equipment. As illustrated by the project "Ready.be," it is evident that the habits of Belgian consumers cannot be changed overnight. Belgians are generally satisfied with their mobile phones and do not wish to upgrade. In addition, debit and Proton cards are widely accepted by Belgian consumers and retailers, and these cards are viewed as easy and cost-efficient methods of payment. However, further technological developments may lead to the interaction of mobile phones with debit and Proton cards in a machine-to-machine (M2M) network.

#### **4.5 Competitive Analysis**

In Japan, DoCoMo's iMode is domestically successful with WAP technologies (the company has 16 million users, or one in eight Japanese). This technology is a success because the average customer is willing to pay for these applications and the equipment upgrades; therefore they already have a market beyond that of business users. Consequently, the growing "mobile communities" have been successful in Japan and numerous mobile financial organizations have been established. iMode use is charged to customers according to the data consumed, not by the number of minutes consumed, which has drawn interest from previously reluctant mobile users.

KPN Orange is currently in a mobile Internet deal with DoCoMo and plans to exploit the success of iMode services in Belgium, the Netherlands, Luxembourg, Germany, and the UK. Along with TIM (Telecom Italia Group), who will work with other European countries, KPN plans to establish a WAP and iMode platform to challenge pan-European operators. Some are skeptical on the success of iMode in Europe; they see it as a leisure item rather than something to be trusted with financial transactions. Another challenge for iMode in Europe will be its equipment restrictions, such as a standard screen size.

Another company heavily involved in m-commerce is Unitronics of Israel. The company has been working with Euro.NM of the Brussels Stock Exchange on a technology aiming to connect mobile phones with vending machines and with payment devices for parking ramps, gas stations, etc. Eventually, the company plans to connect mobile devices with automated and industrial systems via Program Logic Controllers (PLC) implanted in the mobile phones/PDAs and the respective machines.

## 5 Bulgaria

## 6 Croatia

### 6.1 Summary

Due to the existing monopoly in the field of fixed wire-line telecommunication network provision, the telecom market is suffering from dependence on the incumbent operator, Hrvatske telekomunikacije (Croatian Telekom, HT), to provide them with local loop as well as international access. However, the draft of the new Telecommunications Act envisages the liberalization of international connectivity infrastructure for mobile operators, which will allow this market segment to grow unimpeded by often not timely available HT's international connectivity capacity. The matter of international connectivity for ISPs has not been addressed in the current proposed draft of the new Telecommunications Act - however, there are indications that this market segment will be liberalized in the short term.

The Croatian market for telecom services is divided between one fixed voice/data operator, two mobile phone operators (with three networks) and some 10 ISPs. Croatia is lagging behind other CEE countries in terms of Internet utilization and e-commerce, with only a couple "pioneer" on-line shop projects and three banking web (and WAP) sites. With a total of 140,000 Internet subscribers (September 2000 data, total number of users estimated at 280,000) and 350,000 PCs, Croatia is far from using all of its market potential, especially given the relatively high level of high school and university education.

In the field of public fixed/mobile networks there are only two competitors:

- **Hrvatske telekomunikacije (HT, Croatian Telekom):** a monopolist in fixed telephony, operating MOBTEL (analogue) and CRONET (digital) mobile networks; 35% owned by Deutsche Telekom AG
- **VIPNet GSM d.o.o.:** 2nd mobile operator (digital network), a consortium of Austria's Mobilkom, Western Wireless, Vecernji list (local newspaper publisher), Croatia osiguranje (insurance company) and Ingra (major local construction contractor).

VIPNet claims to have some 500,000 customers, which includes pre-paid service users. On the other side, HT claims to have more than 200,000 CRONET subscribers, 300,000 pre-paid CRONET users, 70,000 MOBTEL and BIP (pager) service users. This brings the total of mobile subscribers in Croatia to over a million.

Recent press articles indicate that the Croatian government might be reconsidering the terms of the concession agreements with VIPNet and CRONET, which does not allow the tender for the

third mobile license before October 2003. Although it would have to remunerate the existing operators, there are arguments to support the opening of the tender for the third license during this year. Budget constraint is certainly one of them, but there is also a clear benefit to the market because of lower pricing and increased penetration, projected to reach over 50 percent within 18 months from the entry of the third participant, as well as broadening of the tax base. However, since the license will most probably not allow the provision of the UMTS, the question of licensing for this service is still open. One of the models considered is to charge the UMTS licenses to the two current operators, allowing the third one to roll out the UMTS without any licensing costs. The rationale is that the third GSM operator would be reluctant to pay for another license in the short period, as it might prove financially unfeasible.

## **6.2 Market Overview**

At the end of 2000, VIP NET reported some 15m SMS messages sent from its users monthly, while CRONET reported 30m. This is not high considering the world total of 9 billion SMS messages sent in August of 2000. However, due to dramatic increase in use of SMS messages, HT has to add capacities to its existing servers in order to avoid increasingly frequent delays. Although CRONET network initially provided better territorial coverage, communication outages or delays were more frequently experienced than in VIPNET's network.

Both operators are offering a limited range of information services to its subscribers through SMS (sports, weather, business info); Privredna banka Zagreb and Zagrebacka banka are also offering information on the account balances and the exchange rates via SMS. WAP usage is also very low, primarily because of the lack of available content.

Generally, m-commerce is not yet developed in Croatia and the general feeling is that the operators, content providers and subscribers are waiting for the UMTS rollout.

Again, the usage of the UMTS will largely depend on the content provision and business orientation towards e- and M-commerce, which is currently not present.

### **6.2.1 Regulation**

EU directives regarding the liberalization of the wireless telecommunications will be included in the new Telecommunications Act, which is already drafted. Licensing procedures for the telecommunication services using the radio-frequency spectrum are left over to the member EU states to define; Croatian Ministry for Maritime Affairs, Transport and Telecommunications decided to draft the regulation to allow granting of the respective concessions based on the auction through public tender.



### **6.3 M-commerce technologies**

Both CRONET and VIPNET have introduced GPRS switches to their networks. However, the usage is limited as the penetration of PDAs is very low, with most of the customers relying on voice and SMS services for communication. Consequently, cell phones are the most common devices for wireless telecommunication.

Wireless protocols as Bluetooth and 802.11b are not widely implemented; however, Bluetooth hardware and software products are present in Croatia. Windows is the most widely accepted operating system, with Microsoft IE or Netscape Navigator as the most common browsing tools.

Banks usually rely on authentication card - token - to provide security and exclusive access to Internet banking for their customers. Zagrebacka banka, Croatia's largest, plans to introduce Smartcard and PKI for Internet banking access and has presented the card and the peripheral reading device. For orientation purposes, Zagrebacka banka has some 50,000 users of telebanking service and expects a significant number thereof will be interested to use e banking.

### **6.4 Competitive analysis**

Internet banking is only in the very early stage of development primarily because of the customers' reluctance to rely on non-traditional ways of performing transactions. Another reason is the unwillingness of the Austrian, Italian and German banks and insurance companies to invest in Internet based B2C solutions after entering the market by acquiring local companies with often very developed branch network.

Some of the brokerage companies developed their web sites to enable Internet based trading, but since the Zagreb Stock Exchange prevented the usage of real-time trading information (turnover, volume, quotes), the significance of this product was very low.

U.S. companies are present on the market primarily as suppliers of telecommunications equipment (Cisco, Lucent) and terminal equipment, although the major suppliers to the national carrier and the two mobile operators are Ericsson and Siemens. It is important to note that Croatian companies often feel more comfortable procuring the equipment from vendors with local presence, primarily because of maintenance reasons. U.S. companies have already expressed interest in participating in the tender for the 3rd mobile network concession, but the timetable for the tender as well as the conditions (UMTS or just GSM, pricing) are not yet defined.

It is important to stress that the regulation, which is currently being addressed by several consultants and working groups, should comply with the WTO and EU requirements and eventually liberalize the whole telecommunications market after the beginning of 2003. In the meantime, market segments such as Internet service provision and related infrastructure build-out should be liberalized to attract competition.

## **6.5 Statistical information**

**Population:** 4.7 million

**Number of PCs:** 350,000

**Number of ISPs:** 10 (end 2000)

**Number of Internet subscribers:** 140,000 (September 2000 data)

**Number of mobile operators:** 2 digital, 1 analogue

**Number of mobile subscribers:** cca 1 million (end of 2000)

**Mobile usage penetration:** 22 percent, estimated to reach 50 percent within the next 2 years

**Percentage of digital fixed network:** 95 percent

**Percentage of telecommunication traffic through fiber optic cables:** 92 percent

## **6.6 Contact information**

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#### 6.6.1 E-banking sites:

Zagrebacka banka: [www.zaba.hr](http://www.zaba.hr)  
Privredna banka: [www.pbz.hr](http://www.pbz.hr)  
Medjimurska banka: [www.mebanet.com](http://www.mebanet.com)

## 7 Czech Republic

### 7.1 **Summary**

Development of mobile telephony has been very rapid in the Czech Republic. Penetration increased from 20% to 40% of population during 2000. The number of mobile phone users outreached the number of telephone fixed lines. There are currently three mobile operators competing on the market. When implementing their networks in 1997-1999, operators were concentrated mainly on offering telephony and SMS services, while during 2000 they have started to launch up-to-date technologies to become competitive on the market offering wider range of services.

The most successful m-commerce segments are e banking, followed by infotainment services and e-shopping. E-banking and e-shopping services are strongly enhanced by implementation of technologies, enabling secure electronic transactions. Further implementation of the GPRS (General Packet Radio Service) technology in all three GSM networks will enable to expand offer of information services, as well as the GPS (Global Positioning Service) service. The UMTS (Universal Mobile Telecommunication Services) licenses will be tendered during 2001, according to the Czech government recent decision, but the technology will not be launched before 2003-4. The high potential growth is expected in the following market segments: expansion of WAP (Wireless Application Protocol) services, implementation of new technologies such as GPRS and expansion of high speed data services; handsets for modern services, that support GPRS; and software application development.

## **7.2 Market overview**

There are three mobile operators competing on the market: Eurotel, that holds 50% of the market; Paegas, which holds 43% and Cesky Mobil which holds 7%. Eurotel has focused on corporate clients, while Paegas and Cesky Mobil have focused more on packages oriented to young people and non-business customers. Pre-paid services have become very attractive and all three operators have approximately 50% customers in this segment. The most popular service is SMS messaging, currently, the revenue for SMS exceeds 10% of total operator revenue.

The total number of mobile phones reached 4.31million in January 2001, of which Eurotel has 2.171 million, Paegas 1.85 million and Cesky Mobil 300,000 clients. A yearly increase of 10% is expected to take place in 2001. The coverage of mobile networks is 98-99% of population.

## **7.3 M-commerce technologies**

### **7.3.1 Services**

All three operators have launched the WAP services during 2000. WAP service, that enables connection to internet, allows operators to offer service packages, such as Internet surfing, free e-mail box, and managing the phone via internet (call forwarding).

Eurotel was the first to implement the HSCSD (High Speed High Circuit Switched Data) and the GPRS technologies during 2000, while Paegas and Cesky Mobil are still in stage of testing the GPRS technology. Both companies plan to offer GPRS commercially by mid 2001. As the GPRS technology offers higher speed, and is being supported by wider range of handsets than the older HSCSD technology, Paegas and Cesky Mobil do not plan to implement the HSCSD.

The early launch of advanced technologies has enabled Eurotel to lead the mobile service market segment. The HSCSD technology suits best to professionals who need mobile access to LAN networks, as it enables connection to Internet at the 43kbps speed, while the GPRS service is suitable for access to Internet via WAP.

During 2001, the Czech government plans to sell four UMTS licenses, of which three will be offered to current operators and one license will be sold via auction. The government expects to sell four licenses for minimum of \$ 540 million, while operators consider such price as non-realistic due to the situation in other European countries. It is expected that investment for UMTS implementation could reach \$ 800 million. Operators expect to implement the UMTS in 2003-4.

The WAP service enables operators to start offering services, such as m-banking, m shopping, and searching for information. Switching to the GPRS, the range of services will be much broader. Very popular is search for travel information, cultural events, and sport info. In a preparatory stage, there is a project on informing public on administration procedures via mobile phones. Among the growing market segments are financial and investment information. Recently, Private Investors, a U.S. company located in the CR, launched a new service (W@P investor), that enables to invest on the U.S. stock market via mobile phone.

The m banking and m shopping are among the most rapidly growing services. During 2000, when the competition in banking started to grow, most of local banks have launched the e-banking services. All three operators have e-banking service with several banks included in their service packages. The GE Capital Bank leads the GSM banking with 69,000 clients.

### 7.3.2 Security

Faster growth of m-commerce was hindered by payment problems. Currently, most payments were done via bank accounts, or by credit cards, but clients were often reluctant to provide number of credit card and bank account information. The first Internet bank, the e-Bank, established in 1998, offered direct payment to its clients. Since 2000, the Europay company in cooperation with local banks and GSM operators has implemented a safe payment method via mobile phones. The payment procedure is based on the Wireless Public Key Infrastructure (WPKI) technology that is implemented into mobile phone SIM card. It enables the client to use digital signature when approving transaction. The client has control over payment and bank provides client authentication.

Eurotel has introduced safe payment service called Juice Pay. It is based on project, launched in October 2000 and tested until January 2001 with a goal to establish trust in transactions provided via the Internet and mobile phones. The Juice Pay service enables client with bank account at any bank to establish a virtual account at the Citibank and provide payments through this virtual account at shops that are connected to the network (currently selling CDs, flowers, books and tickets). The project was very successful and attracted a number of new Eurotel clients, as well as increased the number of shops in the network.

## 7.4 **Competitive analysis**

The competition on the mobile market has become rather strong after January 2000, when the third operator started to offer its services. The following competitive factors has become key factors for market success:

- Implementation of new technologies (HSCSD, GPRS), that will enable to offer new services. High growth is expected in the segment of professional services, such as reliable and fast access to Internet, enabling to send and receive e-mails with text attachments and graphic files, transfer of video files, and access databases via mobile phone connected to computer
- Providing wide range of services in order to target services to specific groups of clients
- Development of related services that will increase m-commerce opportunities, such as safe payment in shops, and safe bank transactions
- Adoption of good marketing policy (subsidized handsets, pre-paid services, packages targeted to specific group of clients)
- Increasing network efficiency, improving signals especially in buildings

In the market segment of network implementation, the key players on the Czech market are the following firms: Alcatel, Ericsson, Nokia, Nortel, Motorola, and Siemens.

U.S. firm Motorola holds 30% of the market for network implementation, and its portion is expected to grow with implementation of the GPRS technology.

The market for handsets is driven by technologies, used in operators' networks. In the past year, the market was dominated by handsets that support the WAP service. There were 2,310,000 handsets sold on the Czech market in 2000. Nokia leads the market with 42%, followed by Alcatel with 25%, Siemens (19%) and Ericsson (15%). Benefon, Bosh, Motorola, Sagem, Philips, Samsung, Panasonic and Sony handsets hold the rest of the market. There is a lack of handsets supporting the HSCSD and GPRS technologies. Motorola has recently introduced handsets that support the new technologies and has a great chance to get a large portion of the future handset market.

## 7.5 Statistical information

	1999	2000	2001est
A) Number of mobile lines	2,000,000	4,321,000	5,800,000
-Eurotel	1,250,000	2,171,000	2,690,000
-Paegas	750,000	1,850,000	2,360,000
-Cesky Mobil	300,000	750,000	
B) Turnover in the telecommunication market (million USD)	1,944	2,400	3,200
C) Internet users (percentage of population)	8.4	15.2	26
-people with Internet connection at home	2.2	4.7	10
-people with PC at home	14.7	25	35
D) General Economic Data:			
GDP per capita: 5,153 USD			
GDP growth:		2.8%	3%
Inflation:		4%	4%

## 7.6 Contact information

### 7.6.1 Operators

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## 8 Denmark

### 8.1 **Summary**

As a part of the technologically sophisticated Nordic Region the Danish market is one of the most developed markets in the world in regard to mobile communication and use of wireless devices. The Danish telecommunication and IT industry has experienced high growth rates in recent years and the high tech industry has now become one of the most important industries of Denmark. During the year 1999-2000, the telecommunication sector experienced 15 percent growth. More than 250,000 Danes, corresponding to almost 10% of the Danish workforce, are employed within the area of IT and communications.

According to figures from The National Telecom Agency the number of mobile subscribers in Denmark is gaining rapidly on the numbers of fixed subscriber lines and in approximately 1 year from now the amount of mobile subscribers will outnumber the fixed network subscribers. The most recent figures show that more than 60% of the 5.3 million inhabitants of Denmark today own a mobile telephone and use it daily. On top of that the Danish market enjoys some of the lowest telecommunications fees in the world.

The amount of mobile phones on the Danish market and the widespread use of new services such as SMS-messages and WAP sites proves that the Danish consumer is ready and willing to embrace new opportunities within mobile commerce. The fierce competition proves the amount

and prospects of the market but also works as an entry barrier for new players. This is especially a fact for telecom providers but also producers of new wireless devices will face huge difficulties in entering the Danish market.

With mobile internet still in its infancy it is difficult to see which kinds of services and technology that will be dominant and win the on line consumers. But the Danish population is ready and willing to test new products and the Danish Government is also keen on developing the Danish society into one of the most advanced countries in the world.

A major reason to enter the Danish market is that the competitive environment has nurtured many strong small and medium sized players. This leads to obvious partnering opportunities for US companies that want to engage in strategic joint ventures and extract know-how and advanced market information.

## **8.2 Market Overview**

Almost all of the major Danish telecom providers offer a variety of mobile services to the customers. The most common services are person to person services such as SMS and chat; particularly the use of SMS has experienced a high growth rate the past few years. SMS is not only a means of communicating between persons but is also used between persons and machines to get information on demand and to interact with corporations. Many companies are using SMS messages in their marketing campaigns to enable the consumer to reply in different ways, to participate in competitions, to get further information, etc.

The services provided to users of WAP phones are far more advanced and content rich than the SMS services but since it initially was promoted as the new “mobile Internet” a year ago WAP has experienced a roller coaster ride. In the beginning it was assumed to be the 3<sup>rd</sup> generation (3G) of mobile communication but the hype was quickly replaced by disappointment among the consumers when they realized that this was not comparable with normal web-based Internet, neither in speed nor content.



Of the 3 million mobile phones on the Danish market about 3 percent – approx. 100,000 - of these are WAP-phones which is a small number compared to the wide penetration and acceptance of wireless devices in Denmark - but still higher than the average use in other countries. A lot of the Danish Internet sites also have a WAP component where the users can get WAP enabled information on a variety of topics, such as:

- Finance – News, Bonds, Exchange rates, Stocks (Copenhagen Stock Exchange, NASDAQ, Dow Jones, etc.), Market comments
- Culture – Events, Sights, Cinemas, Hotels
- Law – Legal issues, Court rulings, Consumer rights, Patents, EU-law
- News – National, International, Sport, Business, Economics
- Weather – Forecasts, Nationwide, Local, International
- Traffic – Taxi numbers, Changes in the schedule of Flights, Ferries, Trains or Buses
- Locations – Finding names, telephone numbers and addresses
- Entertainment – Different online games, Stories, Jokes, Quizzes, Horoscope

Some of these services have also been made available for SMS users and most of the telecom operators provide content services for their customers with a variety of messages that can be requested free of charge and send to your mobile phone on a daily basis.

The number and the quality of services based on WAP are increasing and the tariffs are being reduced. The biggest Danish WAP portal, Wapportal.dk, has 550 services and 11,000 registered users. The most popular Danish WAP site is Krak, which helps users to find locations and addresses by offering a catalogue of addresses and maps. Krak has 16,000 users per month and expects a five-fold increase in their market share next year. DSB S-tog, the company that operates urban trains in Copenhagen, has the second most visited site, followed by the portal Jubii and a cultural guide.

The future development of the mobile network in Denmark is focusing on expanding the bandwidth for faster wireless connections. Currently the general speed for transmitting data via the wireless web is between 9.6 and 14.4 Kbps. Within only 2-3 years the speed will have doubled more than five times making it possible to use wireless applications for advanced services. As of now the GSM network is the most common in Denmark but the GPRS-system - built upon the existing GSM network – is now operative in many parts of the country opening new possibilities for services with the “always on” technology. It is still too early to say anything about the penetration of these new wireless devices but the producers and telecommunication providers are confident in the prospects of the technology.

### 8.2.1 Opportunities within the Wireless Mobile Internet market

As mentioned above there are already many companies in Denmark developing innovative Internet and wireless applications for telecommunication operators, e.g. within information services and entertainment. The market trend suggests that suppliers of telecommunication infrastructure and dedicated service creation houses will deliver more and more specialized applications to the telecommunication operators, as they can more effectively develop the applications than the individual telecommunication operators.

The media convergence, pushed by the new digital technology, is especially visible within the area of mobile operators and infrastructure and handset suppliers. Siemens, for example, is

offering access to Yahoo! Mail, bundled with its IC 35 terminal. In September 2000, the French GSM operator Mobilix (France Telecom) announced the establishment of a media division in Denmark with 40 people, to “put turbo on the content” for WAP.

The use of WAP and SMS services among the Danish consumers has resulted in a sharp increase in the number of providers of value added services for the mobile industry. IBM Danmark A/S announced the world’s first WAP bank in September 1999, developed in Copenhagen for Handelsbanken in Sweden. Soon after, IBM Danmark A/S supplied a similar bank for Banesto in Spain.

Realtime A/S is a leading European provider of information and entertainment services to the mobile market. The Danish company, founded in 1998, provides market-ready portals based on extensive knowledge of end-user needs and behavior and a qualified technological approach linking the wireless, Internet, and TV media. Realtime embraces all facets from initial product design to implementation and operation.

Wapteams A/S is a Danish company that has launched its first product: Waproject. Waproject brings its advantages to bear on all members of project teams: in-house or on-site organizations, people on the move, including part-time or short-term team members. Among longer term advantages of the product are easy review of completed projects and more reliable estimates for future projects. Companies such as L.M. Ericsson, Arthur Andersen and Maersk IT have adopted Waproject to communicate and control their work in project groups. Furthermore, Wapteams has signed cooperation agreements with L.M. Ericsson, Hewlett-Packard and Microsoft.

MobileThink A/S helps clients develop new business opportunities with the help of new mobile Internet technology. MobileThink specializes in being the best in developing WAP-based solutions that is tightly integrated with cutting-edge Internet information systems.

### 8.2.2 Key Players

Denmark has a very advanced fixed and mobile telecommunication infrastructure with a variety of platforms and technologies to serve the needs of companies, institutions and private households. Denmark is determined to be among the avant-garde in the new e-society by ensuring competition in the sector and constantly presenting new initiatives to the market, not only to guarantee users sufficient broadband capacity but also to create alternative solutions.

Denmark has two 2nd generation mobile networks: GSM900 (two licenses) and GSM1800 (four licenses). The owners of the GSM900 networks are TDC (Tele Danmark) (SBC Communications) and Sonofon (Telenor/BellSouth) while TDC (Tele Danmark), Sonofon, Telia and Mobilix are owners of the GSM1800 networks. Additional GSM licenses are to be issued early 2001. It is planned to issue two more GSM900 licenses and two more GSM1800 licenses.

The table below shows the number of mobile subscriptions and the key operators as of July 1<sup>st</sup> 2000:

Company/Type	<u>1. H 2000</u>
<b>NMT</b>	
DC (Tele Danmark)	89.287
<b>GSM 900/1800</b>	
debitel	143.687
Mobilix	450.466
Sonofon	790.291
TDC (Tele Danmark)	1.331.062
Telia	207.765
<b>Others</b>	8680
<b>GSM total</b>	2.931.951
<i>Among these activated pre-paid cards in total</i>	<b>1.219.097</b>
<b><i>Subscriptions in total</i></b>	
Source: National Telecom Agency	

The table below, giving an overview of some of the Danish companies that conduct R&D in wireless technologies, illustrates how Danish companies and research institutions are working with the newest wireless trends and technologies. Besides the wireless technologies listed in the table, Danish companies and research institutions operate in other standards, such as TETRA, EDGE, DECT, Satellite, IS-95, CDMA and GPS. The table includes both a list of Danish companies and subsidiaries of international companies that are conducting wireless R&D in Denmark.

Company	GSM	GPRS	UMTS	WAP	Blue-tooth
Analog Devices <a href="http://www.analog.com">http://www.analog.com</a>					
Bang & Olufsen <a href="http://www.bang-olufsen.dk">http://www.bang-olufsen.dk</a>					
DWD <a href="http://www.dwd.dk">http://www.dwd.dk</a>					
LASAT Networks A/S <a href="http://www.lasat.com">http://www.lasat.com</a>					
L.M. Ericsson <a href="http://www.ericsson.dk">http://www.ericsson.dk</a>					
Maxon Cellular Systems Denmark <a href="http://www.maxon.dk">http://www.maxon.dk</a>					
Motorola A/S (the former Digianswer A/S) <a href="http://www.digianswer.com">http://www.digianswer.com</a>					
Nokia Danmark A/S <a href="http://www.nokia.dk">http://www.nokia.dk</a>					
RTX Telecom A/S <a href="http://www.rtx.dk">http://www.rtx.dk</a>					
Shima Communication A/S <a href="http://www.shima.dk">http://www.shima.dk</a>					
Siemens A/S Denmark <a href="http://www.siemens.dk">http://www.siemens.dk</a>					
Telital R&D Denmark A/S <a href="http://www.telital.dk">http://www.telital.dk</a>					
Texas Instruments A/S, Denmark (the former ATL Research A/S) <a href="http://www.atl.dk">http://www.atl.dk</a>					
Source: Ministry of Foreign Affairs					

### 8.3 M-Commerce Technologies

During the past few years there has been an extensive focus on mobile technologies throughout Europe and the issuing of new licenses. Especially the issuing of the licenses for the UMTS frequencies have attracted a lot attention and huge amount of funds have been and are planned to be spent from the Telecom operators in order to get and develop this 3G mobile Internet.

In common with the majority of Western European nations Denmark has been focusing on mobile technologies and the demands and prospects of new bandwidth licenses. The introduction of new mobile technologies is bound to further open the market for M-commerce applications, content providers and producers of new and enhanced services.

The Danish Government reached an agreement on October 7, 1999 that initiated a number of new frequency policy initiatives in order to secure users access to the latest and most advanced communications tools. The agreement includes assignment of radio frequencies, primarily by public tendering of spectrum resources for 3 purposes:

### 8.3.1 Public fixed wireless access networks (FWA)

Mobile services for emergency and public safety purposes and other specific communications requirements (such as TETRA)

Third-generation digital mobile communications systems (UMTS)

### 8.3.2 FWA (Fixed Wireless Access)

FWA is a wireless alternative to the subscriber network (the raw copper). It is a wireless fixed subscriber network allowing services and facilities that require large bandwidth that is necessary for graphics-heavy data files, video on demand, interactive multimedia and remote education in real time.

The National Telecom Agency will grant licenses for FWA in two frequency bands: three licenses in the 3.4-3.6 GHz band for use by services based on data transmission speeds of up to 2 Mbit/s.; four licenses in the 24.5-26.5GHz band for use by services based on data transmission speeds of more than 100 Mbit/s. FWA systems may thus be used for providing the same services as can be delivered through the fixed network. As a result, the frequency tender for FWA will be able to stimulate the creation of a competition-driven market for subscriber connections using high transmission speeds.

In early 2000, the National Telecom Agency initiated the process of tendering frequencies for FWA. At the end of the bidding period for FWA frequencies on September 1<sup>st</sup>, 17 companies (both international and Danish) had made bids for the FWA frequencies and on December 18<sup>th</sup> seven companies were selected to utilize the frequencies. The winners of the FWA licenses are:

#### 8.3.2.1 *3.5 GHz band:*

Formus Communications Denmark ApS (Formus Communications Inc., US)

In2Loop A/S (Tele2)

SONOFON Service A/S (SONOFON)

#### 8.3.2.2 *26 GHz band:*

Formus Communications Denmark ApS

Global Connect Access A/S (Global Connect A/S)

mediascape communications AG

SONOFON Service A/S

### 8.3.3 TETRA (Terrestrial Trunked Radio)

Today, the various emergency, security and safety services, along with transport, taxi and haulage companies, etc., use a number of different analogue radio systems. These systems ensure the users full control of their own networks. Such radio systems may be used separately by a limited user group. They enable group calls (one radio can call several other radios simultaneously), fast through-connect (radios can be linked with each other immediately) and priority control (calls can be interrupted in favor of more important calls). The disadvantage is that most often these are small, regional networks that cannot communicate with each other.

TETRA is a digital mobile system, which is basically constructed like regular mobile network systems such as the GSM systems, which enables full, nationwide coverage and higher capacity.

At the same time, like present analogue PMR systems (Private Mobile Radio), TETRA has features such as group calls, priority control, fast through-connect and direct mode (direct calls between terminals). Thus, TETRA is well equipped to answer the communications needs of emergency and safety services, as well as other specific communications needs.

TETRA makes it possible to build one single nationwide emergency and public safety infrastructure to ensure smooth communication among all emergency management organizations. Likewise, the goal is to ensure improved communications facilities for various business users, including transport, haulage and taxi companies. Evaluating the tenders and subsequently selecting the license holders will be realized according to a number of evaluation criteria, including the range of end-user products, service provider access, prices and the coverage of the projected network. Moreover, the quality of the projected network will be considered, along with the bidder's competence, experience and financial situation. A timetable laid down by political agreement requires the licenses to be issued no later than August 2001. However, the National Telecom Agency expects to issue the licenses by late June 2001.

#### 8.3.4 UMTS (Universal Mobile Telecommunications Systems)

3G mobile networks are mobile high-speed networks. As mentioned above, GSM today offers data transmission rates of 9.6 kbit/s, increasing in the coming years to 171 kbit/s with GPRS and 384 kbit/s with EDGE (Enhanced Data for GSM Evolution). In comparison, 3G mobile networks will offer speeds of up to 2 Mbit/s. This will enable the transmission of video clips, videoconferencing and other multimedia services requiring high data transmission capacity. Thus, 3G mobile systems will help answer the growing communications needs of coming years, including Internet access from mobile terminals with a data transmission capacity equal to or higher than the current capacity of an ordinary fixed network telephone line or ISDN.

With 3G mobile networks, service providers are expected to play a much more important part in the market. For instance, they will be able to a great extent to develop their own services. This should provide scope for a wide range of innovative, attractive and competitive services. The National Telecom Agency participates in an interdepartmental working group which will lay down the framework for the auction. The National Telecom Agency will then carry out the actual auction later in 2001. It is expected to be completed no later than October 2001.

#### 8.3.5 Consumer technologies

As mentioned earlier Denmark is very advanced when it comes to dissemination and use of high tech products and services. Obviously this is also the case for m-commerce instruments and the Danish market tends not to be different from the rest of the European market, with huge market shares to companies such as Nokia, Ericsson, Motorola etc. All the major wireless producers are present in Denmark and in general the availability of new products matches the demand.

#### 8.3.6 Software Preferences

In regard to software preference the major operating systems are the Microsoft Windows CE and Palm OS, but also systems such as EPOC, OSE Basic, Auto PC, VxWorks and REX are present in the market.

### 8.3.7 Security Issues

The Danish clearinghouse PBS has worked on a system that enables the user to make secure payments from the mobile phone. The system resembles the SET (Secure Electronic Transactions) concept in the sense that users have to be registered and approved by PBS before any transactions can take place. It is also necessary to have a special piece of software installed on the phone, and the users must obtain a new SIM card from their phone dealer.

The payment is carried out by exchange of an electronic payment certificate and no card or account numbers are transferred via the phone. The identity of the user is confirmed through the SIM card and the PBS already has all the information on the account to use for the transaction. The system is therefore considered to be at least as safe as payment with the widely accepted Dancard - which is the dominant debit card in Denmark. In a sense it may be even more secure as it is using phone's SIM card as a means for identification instead of the magnetic strip on the Dancard, which is easier to copy. In comparison with Internet payments it is certainly more secure than payment using the SSL technology.

Compared to ordinary card payments, mobile phone payments have the advantage that the mobile phone replaces both the physical card and the card terminal as well. Therefore payments can take place anywhere far away from both the recipient and the bank. It is also independent of access to a computer or to the Internet. The only condition is that one must have a mobile phone and be within the reach of a GSM network.

## 8.4 **Competitive analysis**

Factors which will make U.S. companies at ease doing business in Denmark are:

- The United States is Denmark's largest trading partner outside the EU.
- Danish customers are very receptive to high Tech products.
- Local companies are very internationally oriented.
- There are already some 300 U.S. subsidiaries in Denmark.
- The telecom sector is very US-dominated, the major players being SBC/Ameritech and Bellsouth. MCI and others are also making inroads in this market.

Factors which may have negative influence on “progressive” US marketing techniques are:

- Danish consumers are relatively conservative, they prefer to buy products that have already proven their technology and value.
- Danish companies believe in long-term relations. Companies that are in the market chiefly to “make a fast buck” may find better opportunities in markets other than Denmark.

Today, the liberalization and privatization of the Danish market is complete. The Danish telecom services market is open on a non-discriminatory basis. Only the fierce competition offered by the approximate 50 present service providers present a major challenge to new-to-market providers.

During the past years the penetration of mobile phones among the Danish population has grown tremendously which is mostly due to an aggressive marketing strategy from these major telecom providers. Almost every mobile phone is sold with financial support from the provider that assigns a subscription with the sale and some mobile phones are practically given away for free in order to enroll consumers as customers.

Given these circumstances it is difficult to penetrate the market for mobile phones without agreements with telecom providers that wishes to subsidize the phones or alternatively to sell them at or below cost. This fact is an entry barrier for a new-to-market product that calls for large investments in marketing and advertisement needed to convince the consumers and the telecom providers of the quality of the product.

However, there seems to be some good opportunities for content providers and developers of new innovative services for the mobile Internet. Being a small market in terms of population and geography but highly developed and advanced Denmark is an obvious test-market for high tech products and services. Another good reason for entering the Danish market within M-commerce will be the possibility of establishing partnership with highly advanced players proficient in English with a top level of international awareness and ambitions.



## 8.5 Statistical information

### 8.5.1 Main Figures

	<u>1. H 2000</u>	<u>1999</u>	<u>1. H 1999</u>	<u>1998</u>	<u>1. H 1998</u>	<u>1997</u>
Subscriber lines in Denmark – fixed network (1,000)	<b>3.682</b>	3.638	3.566	3.496	3.402	3.341
Subscriber lines per 100 inhabitants – fixed network	<b>69,0</b>	68,3	67,0	65,8	64,2	63,1
Customers using carrier selection codes	<b>1.862.437</b>	1.515.874 <sup>3)</sup>	1.169.311	501.667	383.087	196.928
Outgoing fixed line traffic (mill. minutes)	<b>10.817</b>	...	...	...	...	...
<i>Mobile subscribers in Denmark</i>	<b>3.021.238</b>	2.628.585	2.290.780	1.931.101	1.574.182	1.444.016
Mobile subscribers per 100 inhabitants	<b>56,6</b>	49,3	43,0	36,3	29,7	27,3
Outgoing mobile traffic (mill. minutes)	<b>1.200</b>	2.117	1.085	1.621	759	1.301
Total amount of SMS sent (1,000)	<b>278.306</b>	...	...	...	...	...
Internet subscriptions	<b>1.524.365</b>	1.135.393	...	...	...	...
Internet subscriptions per 100 inhabitants	<b>28,6</b>	21,3	...	...	...	...

Source: National Telecom Agency

### 8.5.2 Mobile telephony - Number of mobile subscriptions

	<u>1. H 2000</u>	<u>1999</u>	<u>1. H 1999</u>	<u>1998</u>	<u>1. H 1998</u>	<u>1997</u>
<b>NMT</b>						
TDC (Tele Danmark)	<b>89.287</b>	107.815	130.003	163.900	204.770	232.610
<b>GSM 900/1800</b>						
debitel	<b>143.687</b>	133.581	125.807	108.281	60.074	22.045
Mobilix	<b>450.466</b>	318.818	186.512	77.613	10.396	•
Sonofon	<b>790.291</b>	774.903	752.752	696.145	609.322	550.601
TDC (Tele Danmark)	<b>1.331.062</b>	1.122.857	938.515	773.181	679.720	638.760
Telia	<b>207.765</b>	170.111	156.191	111.981	9.900	•
<b>Others</b>	8680	<b>500</b>	<b>1.000</b>	...	...	•
<b>GSM total</b>	2.931.951	<b>2.520.770</b>	<b>2.160.777</b>	<b>1.767.201</b>	<b>1.369.412</b>	<b>1.211.406</b>
<i>Among these activated pre-paid cards in total</i>	<b>1.219.097</b>	<b>979.811</b>	<b>641.794</b>	...	...	•
<b>Subscriptions in total</b>	<b>3.021.238</b>	<b>2.628.585</b>	<b>2.290.780</b>	<b>1.931.101</b>	<b>1.574.182</b>	<b>1.444.016</b>

Source: National Telecom Agency

*Incl. activated pre-paid cards. Activated pre-paid cards are registered as activated by the mobile operator and to which it is possible to carry through a call. Please note, that the "lifetime" of pre-paid cards can vary significantly among operators.*

### 8.5.3 Mobile telephony - Outgoing mobile traffic

(1,000 minutes)

	<u>1. H 2000</u>	<u>1999</u>	<u>1. H 1999</u>	<u>1998</u>	<u>1. H 1998</u>	<u>1997</u>
NMT						
TDC (Tele Danmark)	<b>23.300</b>	71.550	43.850	139.624	78.687	194.884
GSM						
debitel	<b>57.275</b>	111.798	53.198	57.865	16.890	5.018
Mobilix	<b>138.999</b>	121.000	104.302	27.502	3.584	•
Sonofon	<b>412.250</b>	753.220	418.309 <sup>2)</sup>	660.038 <sup>2)</sup>	301.100 <sup>2)</sup>	533.587 <sup>2)</sup>
TDC (Tele Danmark)	<b>511.900</b>	1.017.800 <sup>2)</sup>	470.880 <sup>2)</sup>	774.594 <sup>2)</sup>	355.903 <sup>2)</sup>	567.941 <sup>2)</sup>
Telia	<b>54.801</b>	97.342	47.869	19.707	2.600	•
<b>Others</b>	1.521	•••	<b>300</b>	•	•	•
<b>GSM traffic in total</b>	1.176.746	<b>2.045.596</b>	<b>1.041.360<sup>2)</sup></b>	<b>1.481.840<sup>2)</sup></b>	<b>663.187<sup>2)</sup></b>	<b>1.101.528<sup>2)</sup></b>
						8.5.3.1
<b>Outgoing mobile traffic in total</b>	<b>1.200.046</b>	<b>2.117.146</b>	<b>1.085.210</b>	<b>1.621.464</b>	<b>741.874</b>	<b>1.296.412</b>
<b>Source: National Telecom Agency</b>						

### 8.5.4 Mobile telephony

#### Outgoing domestic and international mobile traffic and SMS sent

	<u>SMS messages sent</u>		<u>Outgoing domestic</u>		<u>Outgoing International</u>	
	<u>No. (1.000 )</u>	<u>Share</u>	<u>min. (1.000 )</u>	<u>Share</u>	<u>min. (1.000 )</u>	<u>Share</u>
NMT						
Tele Danmark	•	•	22.200	•	1.100	•
GSM						
debitel	23.246	8%	53.848	5%	3.427	5%
Mobilix	70.936	26%	134.320	12%	4.679	7%
Sonofon	78.525	28%	382.343	34%	29.907	46%
Tele Danmark	86.933	31%	487.600	45% <sup>1)</sup>	24.300	39% <sup>1)</sup>
Telia	18.403	7%	52.713	5%	2.088	3%
<b>Øvrige</b>	263	-	1.475	-	46	-
<b>Others</b>						
Traffic in total	•	•	1.134.499	100%	65.547	100%
<b>SMS in total</b>	<b>278.306</b>	<b>100%</b>	•	•	•	•
<b>Source: National Telecom Agency</b>						

### 8.5.5 Finance - Revenue in the telecom sector 1

	<u>1. H 2000</u>	<u>1999</u>	<u>1. H 1999</u>	<u>1998</u>	<u>1. H 1998</u>	<u>1997</u>
Net revenues						

(DKK million)	15.783	28.941	14.599	25.193	12.308	23.003
Source: National Telecom Agency						

#### 8.5.6 Companies included:

First half of 2000: 12Move, ACN Danmark A/S, Banestyrelsen Tele, CyberCity, Dansk Internet Adgang ApS, debitel Danmark, Euroconnect ApS, Facilicom International A/S, Global Gateway, Global One Communications A/S, GTS Skandinavien, InterNord A/S, Interoute Danmark A/S, Kai Dige Bach, Link Telecom ApS, Mira Internet A/S, Mobilix A/S, Net4you ApS, Powercom A/S, RSL COM A/S, Sonofon Holding A/S, SuperTEL Danmark, Tele Danmark A/S, Tele1 Europe A/S, Tele1000 A/S, Tele2 A/S, TelePassport, Telia A/S, Tjantik ApS, TJ Group A/S, UUNET, WorldCom A/S and World Online Danmark.

1999 Tele Danmark, Sonofon, Mira Internet, Global One, Netmaster, Powercom; RSL Com, Tele 2, Telia (inkl. Stofa), Mobilix, Facilicom Int., debitel, 12Move, Tjantik

First half of 1999 comprises Canvas Interactive, CyberCity, debitel, Facilicom International (Tele8), Global One Communications, Internord, Interoute Danmark (Tele 1020), Mobilix, Net4you Aps, Netmaster, Powercom, RSL COM Danmark, Sonofon Holding, Tele Danmark, Tele1, Tele 1000, Tele 2, TelePartner, Telia, World Call Danmark and World Online Denmark.

Figures for 1998 comprise debitel, Facilicom International (Tele8), Global One Communications, Mobilix, Powercom, RSL COM Danmark, Sonofon Holding, Tele Danmark, Tele 2 and Telia

First half of 1998 comprises debitel, Facilicom International (Tele8), Global One Communications, Interoute Danmark (Tele 1020), Mobilix, Powercom, RSL COM Danmark, Sonofon Holding, Tele Danmark, Tele 1000, Tele 2, TelePartner, Telia og Uni-Tel Europe.

Figures for 1997 comprise debitel Danmark, Interoute Danmark (Tele 1020), Mobilix, Powercom, RSL COM Danmark, Sonofon, Tele Danmark, Tele Danmark Mobil, Tele 2, TelePartner and Telia.

## 9 Estonia

## 10 Finland

### 10.1 Summary

Finland's early liberalization of domestic long distance, international, mobile and data service markets helped give it one of the most competitive telecommunications markets in the world. This environment also promoted high consumption rates of telecommunications services; these include many innovative services that were first introduced in Europe by Finland.

Finland, with a population of 5.1 million people, has the highest Internet and mobile phone penetration rates in the world. Finland is also described as the most networked country in the world. The volumes of telephone lines and telephones are the densest in the world. Data transmission speeds are the highest in the world. The network is 100 percent digitized. Finland was also the first to take ATM technology into commercial use, among other technologies, and the first to grant 3rd Generation (3G) mobile phone licenses. Finland's highly sophisticated telecommunications market serves as an excellent test market for development of new services.

The most well known company among Finnish telecommunication companies is Nokia, the world leader in mobile phones, wireless communications, and telecommunications networks and services. The two largest key players in Finnish telecommunications services are partly privatized Sonera (the former Telecom Finland Ltd.) and the 45 privately owned companies operating under the Finnet Group. The largest of the Finnet Group companies is Elisa Communications (previously Helsinki Telephone Company). Both Sonera and Elisa Communications have subsidiaries and sister companies in various service areas. There are also a number of secondary companies, strongest being Telia Finland Oy, owned by Swedish State controlled Telia.

The Finnish Internet service market is highly developed. Services provided for Finns vary from Electronic Newsletters to Electronic Commerce, which can be considered the fastest growing business. The volume of Finnish E-commerce increased about 30% from spring 1999. The monthly sales volume of Finnish E-commerce was estimated at FIM 113 (\$18) million in February 2000, up from FIM 85 million (\$15.2) in May 1999.

Mobile commerce is attracting more and more interest in Finland. Dubbed M-commerce the new technology follows naturally from a trend that has already brought e-mail, weather information, sports headlines, banking and other services to mobile devices. Finnish software vendor Basware teamed up with Finland's leading telecom operator Sonera to develop electronic invoicing system geared toward the business-to-business market. Dubbed MyEflow.com proposals for the Internet based systems were already announced in May, 2000. The Finnish Government is also providing Finns with national E-identification cards, which are expected to facilitate on-line commerce.

The potential for M-commerce is huge, given the explosive growth in mobile phone use predicted during the next few years. With the number of mobile phones already exceeding the number of fixed phones lines in Finland, M-commerce should be one of the drivers of growth in the years ahead. Companies such as Nokia are gearing up for the advent of shopping by mobile phone. Nokia estimates that the number of mobile devices capable of Internet connections will exceed the number of PCs connected to the Internet in 2003 and that M-commerce will soon become more important than E-Commerce. M-business is new and currently most visible in the telecom sector. However, current technology is new, opportunities are many, but concrete solutions wait to be launched.

## 10.2 Market Overview

One in four owners of mobile devices stops using M-commerce applications after the first few attempts, according to a new report released by The Boston Consulting Group. Despite this high level of consumer frustration, most current and potential users believe that within the next few years, mobile devices that offer these services will play an important role in their daily lives.

There is a big gap between what the technology can do today and what the consumer has been led to expect. The good news is that these sources of consumer frustration – slow transmission speeds, difficult user interfaces and high costs – are being addressed by operators and equipment manufacturers. Despite the initial frustrations of the early users, consumers envision that once many of the glitches are worked out, mobile applications will become an integral part of their daily lives. Given this high level of consumer acceptance, it is expected that M-commerce will be where the Internet was in 1998 in terms of transaction value.

The development of the core GPRS market is also looked on as something of significance for the telecommunications operators, because this way they will obtain a feel for third generation services.

The third-generation market is now at a very strong start-up stage. The third generation products will have to provide their users with services that will save time and money and also offer entertainment. A continuously updated e-mail and E-commerce facility will be essential for wireless services. Another important trend is the changing of the mobile phone into a personal trusted device including authentication and security features. The mobile phone will become a person's wallet that could also include the user's home keys. According to Nokia, the aim is to offer consumers these services smoothly.

Finnish major telecom operators/service providers below welcome contacts from U.S. companies interested in cooperation possibilities.

### 10.2.1 Finland's Key Players/Telecom Operators/Service Providers

The leading local player in the Internet services market in Finland is the partly state-owned, Sonera, formerly known as Finnish Telecom Ltd. Sonera is also a market leader in the mobile voice communications. Sonera's business is divided into two key areas, Mobile/Media and Telecom:

#### *10.2.1.1 Mobile and Media*

The Mobile & Media business comprises mobile communications, media communications and new services. Mobile and Media is also responsible for third generation mobile networks. Its largest unit is Mobile Operations, consisting of mobile communications services for Finnish consumers and businesses; it has over 2.2 million Finnish customers. Mobile and Media business is rapidly becoming more international and it already has associated companies and joint ventures in three continents. Mobile and Media's incorporated services are Sonera SmartTrust (secure wireless commerce and transactions), Sonera Zed (mobile portal company that assembles wireless services), Sonera Plaza (financial services and E-Commerce site on the Internet) and Sonera Juxto (specializes in wireless ASP services).

#### *10.2.1.2 Telecom*

The Telecom business area is responsible for Sonera's fixed network operations in Finland and in regions neighboring Finland. It provides its customers with high quality voice and data services over the network. Telecom aims to be one of Europe's best and most efficient fixed network operators. It consists of the following companies which are wholly owned by Sonera or jointly owned with a partner.

**Sonera Entrum Ltd.** - Provides fixed network voice and data services to consumers, corporations and organizations, locally and regionally. The company operates its own access network in Finland and is also in charge of the fixed network joint ventures in the Baltic States.

**Sonera Solutions Ltd.** - Develops and provides telecommunications and information technology solutions for major corporations and organizations. It provides its customers with modular voice, mobile, data, media and telecommunications systems that make use of the opportunities afforded by the Internet and mobile technology.

**Sonera Carrier Networks Ltd.** - Is responsible for the operation of Sonera's entire backbone network. It is Finland's largest and most international network operator. Besides Finland, Carrier Network's market area covers northwest Russia, northern and central Europe, and the East Coast of North America. The company's customers include not only Sonera, but also many other international operators, Internet service providers, corporate network suppliers and local and mobile operators.

**Primatel Ltd.** - Installs and maintains Sonera's telecommunications networks and those of other operators. It builds and maintains information networks and security systems in buildings. The company's business also includes construction and maintenance of masts and stations.

**TeleRing Ltd.** - Markets and sells IT products and services from almost 80 outlets throughout Finland. Its product range includes mobile services, telephones, computers, faxes, printers, terminal equipment and peripherals. TeleRing serves both ordinary consumers and corporate customers.

**IsoWorks Oy and DataInfo Oy** - IsoWorks specializes in installation and maintenance services for telecommunications and IT equipment. DataInfo is a specialized IT chain consisting of 45 outlets. DataInfo Oy is the chain's service organization and responsible for controlling the business and for centralized procurement, national contracts, training and marketing.

#### *10.2.1.3 Sonera's future prospects*

Sonera is an innovative telecommunications expert. It aims to become a major player in the international market. Its strength is in the diversity of its operations, which cover both fixed network and mobile communications and services. Sonera also cooperates with partners who are world leaders in their own fields. Rapid growth in the use of mobile phones presents an excellent opportunity for Sonera to further expand its wireless services.

Sonera's business growth will increasingly be derived from services. The company will be able to utilize its expertise in international markets. Through Sonera's associated companies it already has over 13 million mobile communications customers. In Finland Sonera has over 2.2 million customers.

Sonera's role as a fixed network operator is also an important part of its business. Sonera's goal is to become the leading fixed network and data traffic operator in the Baltic region. Sonera is already cooperating closely with fixed network telecommunications companies in Russia, Sweden, Lithuania, Latvia and Estonia.

Sonera was among the first to launch several innovative services, such as the now common text messaging services, a security solution for mobile commerce and transactions, and services which make use of positioning information. Sonera's virtual test environment for new services, known as mSpace, is a good example of the company's forward-looking approach.

Sonera has been active in applying for 3G licenses and aims to be a leading 3G operator, as it is in the GSM environment, where international comparison has rated Sonera as the top operator.

#### **10.2.1.4 Elisa Communications**

Elisa Communications, formerly Helsinki Telephone Company, is the largest privately owned telecom operator/service provider in Finland. The company has been listed on the Helsinki Stock Exchange since November 1997 and offers a full range of communication services to its customers.

Elisa Communications begins the new decade with five strategic business areas:

- Personal communications
- Business solutions
- Mobile communications
- Operator network services and
- Information and communications solutions

The Group structure is based on customer-awareness. Elisa Communications has substantial partnership with local telephone companies in Finland. Alongside strategic ownership, the partnership companies actively strive in finding synergies within business solutions.

#### *Internationalization*

Elisa Communications is undergoing strong growth in its international operations. The focus areas have been Germany and the Baltic countries. The Group utilizes its competence and expertise by combining professional partnership and strategic ownership in its international projects. The Group operates in the Estonian market through a mobile operator (Radiolinja Eesti) and wholesaler/retailer of terminals (Makitorppa and Mobinter). Furthermore, the Group in cooperation with Finnet International Oy offers data services for business customers in Estonia.

Elisa's subsidiary, Comptel Oy, which was successfully listed on Helsinki stock exchange in December 1999, has achieved a clear and solid leading position in the global market with its software products. Comptel provides consulting, planning, system development and multivendor customer services to meet the future demands of intelligent network services. More information on Elisa Communications at [www.elisa.fi](http://www.elisa.fi).

#### **10.2.1.5 Radiolinja**

A subsidiary of Elisa Communications, Radiolinja is a GSM operator concentrating on offering digital mobile communications services for private and corporate customers. The company actively produces and develops various voice and value-added services. The world's first GSM call was made in Radiolinja's network on March 28, 1991, and Radiolinja was the first company in the world to open a GSM network in July of the same year. When Finland pioneered in granting licenses for the new-generation mobile telecommunications system UMTS, Radiolinja was again among the first to get the license in March 1999. More information on Radiolinja at [www.radiolinja.fi](http://www.radiolinja.fi).

#### **10.2.1.6 Telia Finland**

Telia is the largest telecommunications company in Scandinavia. Telia Finland handles Telia's operator services in Finland. The company is engaged in a wide range of telecommunications services from private telephone calls to tailored systems for large corporations. For corporate customers, Telia offers a wide range of services, products and telecommunications solutions from conventional telephone systems to the latest Internet services.

The Consumer Services Unit markets fixed-wire network services for households and small companies. Telia's Internet calls are a new and modern way of making use of the global Internet network for communication purposes. The Corporate Service Unit provides telecommunications solutions that support business operations. The unit focuses on offering Internet-based services. The unit is also responsible for call contracts and intelligent network services offered for corporate customers. More information on Telia at [www.telia.fi](http://www.telia.fi).

### **10.2.2 Types of E-Businesses**

Electronic/wireless commerce is presently considered the fastest growing business, as Finnish businesses have been eager to use the Internet. Main M-business services currently in operation in Finland are: WAP banks (Merita Solo, OKO Bank, Leonia), lottery, vending machines and many mobile portals for consumers (operators, media players).

As of mid-2000, directory services were the most popular premium-rate value-added services offered through mobile phones and the Internet in Finland. Growth in this area has been supported by the growth in wireless Internet. The most commonly purchased products (business-to-consumer, B2C) were books, CDs and clothing. The most popular site in the beginning of 2000 was NetAnttila, an electronic department store. Merita Bank's Solo-tori, Sonera Plaza's Ostella and MTV's (Finnish commercial TV channel) ShopIt portals have attracted about half of all E-commerce visitors.



Finland's Technology Development Center has identified the following types of E-businesses:

- E-shops
- E-procurement
- E-malls
- E-auctions
- Virtual Communities
- Collaboration Platforms
- Third-party Marketplaces
- Value-chain Integrators
- Value-chain Service Providers
- Information Brokerage
- Trust Services

***E-shops*** - Web marketing, promotion, possibly ordering and payments

See following local sites:

<http://www.akateeminen.com>

<http://www.area.fi>

<http://www.wapit.com>

[http://www.nokia.com/corporate/wap/order\\_prods.html](http://www.nokia.com/corporate/wap/order_prods.html)

<http://www.sonerazed.fi>

<http://www.radiolinja.fi/askit>

<http://www.weatherplanner.com>

***E-procurement*** - Tendering and procurement of goods and services, seeking suppliers

<http://palvelut.tieke.fi/tati>

<http://www.sarponliikenne.fi/Tarjousp.htm>

<http://www.nurmijarvensahko.fi/hinnasto/tpyynto.htm>

***E-malls*** - Collection of e-shops, aggregators, industry sector marketplace, possibly with a common payment method

<http://www.soneraplaza.net>

<http://www.merita.fi/solotori>

<http://www.inetcom.fi>

<http://www.kolumbus.fi>

<http://www.kauppa.hpy.fi>

<http://www.systeemi.net>

<http://www.kauppakeskus.fi>

<http://www.marketworld.fi/shop/>

[http://www.lomarengas.fi/\(picture\)](http://www.lomarengas.fi/(picture))

***E-auctions*** - Bidding mechanisms, possibly with multimedia presentations of products, contracting, payments and delivery

<http://www.ebay.com> (first m-auction in the world)

<http://www.huuto.net>

<http://www.satakunnanurheiluliike.fi>

<http://www.huutokauppatuote/tuote.5.htm>

<http://www.hagelstam.fi/k69/index.htm>

***Virtual Communities*** - Based on value added communications between members of a community

<http://www.club.nokia.com>

<http://www.internationalwhoswho.com>

<http://www.shakki.net>

<http://www.duuni.net>

<http://www.yl.fi> (Helsinki University chorus homepage)

***Collaboration Platforms*** - Business process cooperation, e.g. collaborative design

<http://www.wapforum.com>/<http://www.h17.com>

<http://www.xml.org>, <http://www.w3c.org>

***Third party Marketplaces*** - Common marketing front-end transaction support to multiple business

<http://www.keltainenporssi.fi>

<http://www.palsta.fi>

<http://www.travel.fi>

<http://www.interva.com>

<http://www.advonet.fi>

***Value-chain Service Providers*** -Specialized in a specific function for the value chain, e.g. logistics and electronic payment

<http://www.posti.fi/uudetpalvelut>

<http://www.fedex.com/fi>

<http://www.merita.fi>

<http://www.osuuspankki.fi>

<http://www.aktia.fi>

<http://www.pankkiyhdistys.fi>

**Information Brokerage** - Value added - digital information, customer profiling, business opportunity brokerage, investment advice, etc.

<http://www.tt-tietopalvelut.fi>

<http://www.kauppalehti.fi>

<http://www.talouselama.fi>

<http://www.e-gateway.net>

<http://www.hex.fi>

<http://www.mtv3.fi>

**Trust Services** - Trusted third party services such as certification authorities and electronic notaries

<http://www.vaestorekisterikeskus.fi>

<http://www.novotrust.com>

<http://www.smarttrust.com>

### 10.2.3 Finland's Technology Development Center (TEKES) Catalyzing E-Business

TEKES, Finland's Technology Development Center is the main financing organization for applied and industrial R&D in Finland. The funds for financing are awarded from the state budget. TEKES is a subordinate of the Ministry of Trade and Industry. Many companies operating worldwide, both foreign and Finnish-owned have located their key resources and laboratories for technological development in Finland. TEKES offers all its services, not only funding for industrial R&D projects, but also expertise and network of contacts with the best technology sources all over Finland. A foreign company located in Finland meets the same criteria for TEKES funding and services as any Finnish company.

TEKES is funding customer-oriented and broad-based projects, which integrate different technologies, applications and services and where new solutions and operational models are developed and tested.

- Basic criteria for funding a project:
- Enhance international competitiveness
- Business and export possibilities
- From innovations into products
- Challenging, technological content
- User-oriented
- Right timing

### **10.3 Contact information:**

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More information on Tekes and its technology programs and projects at [www.tekes.fi](http://www.tekes.fi)

### **10.4 M-commerce technologies**

The tremendous growth in wireless communications is speeding up the construction of mobile networks. The new GPRS and UMTS technologies, which are making the wireless Internet a reality, will bring a new impetus to E-commerce, and both Nokia and Ericsson are competing for the position of number one supplier in the market.

On December 15, 1998, Finland became the first country in the world to initiate the application process for 3G mobile networks. During the application phase, licenses were not tied to any of the competing 3<sup>rd</sup> Generation mobile network standards. The Ministry of Transport and Communications granted four national licenses on March 8, 1999. Unlike in many other countries, Finland's licenses were free of charge and were not issued on the basis of the highest bid.

The mobile electronic Transactions (MeT) initiative was formed by Nokia, headquartered in Finland, Motorola and Ericsson on April 11, 2000, with the purpose of jointly developing and open and common industry framework for secure mobile electronic transactions. The aim of the initiative is to develop safe and easy methods and platforms for conducting e-commerce transactions on mobile phones. MeT also works to facilitate the development of innovative new services and applications – benefiting customers and service providers alike. The initiative uses existing and emerging standards to create a common framework that will facilitate the fast adoption of trusted mobile commerce services globally. Since the establishment, the mobile phone manufacturers, Siemens, Matsushita and Sony have joined the initiative.

The MeT technologies and concepts will work on all networks, with all services, and from all mobile devices. They will draw on existing industry standards such as WAP, Wireless Transport Layer Security (WTLS), Wireless Identification Module (WIM), Public Key Infrastructure (PKI) and Bluetooth. Privacy and security will be ensured with digital signatures and cryptographic services for transaction verification, confidentiality, authentication, and non-repudiation. Examples of MeT based applications include secure access and use of personal credit cards debit cards, loyalty schemes, and ticketing.

### **10.5 Competitive analysis**

Finnish market at the user end is generally seen as receptive to new products that represent advances in technology, quality or other positive attributes. The regulatory framework is open to foreign entrants. Competition is high.

### 10.5.1 Domestic and third country key players: significance, competitiveness, etc.

Local companies have an overwhelming advantage according to the figures. This probably derives from a number of factors, mainly first mover status and a deep historical presence in the market.

The various points of the Finnish telecommunications sector at large have reinforced each other in what has been termed the Telecommunications Cluster. For example, Nokia continues to make the best mobile phones; the software houses continue to develop superior products in their respective niches; and Finnish telecommunication service providers continue to offer whatever innovative services their research and development and supplier bases produce.

As international strategic investment, joint ventures and special purpose alliances continue, the lines between foreign and domestic service providers are likely to blur.

## 10.6 Statistical analysis

### 10.6.1 Statistical Information on Finland IT Sector:

- ISPs (2000): 80
- People online (2000): 2.2 million (population 5.1 million)
- Main phone lines (1998): 286m, per 100: 54.8
- Number of fixed lines (all digital), 1998: 2,8 million
- Cable TV penetration (TV households, 1997): 47%
- Satellite penetration (TV households, 1997): 15%
- Mobile phone penetration (April 1, 2000): 70% - Over 100% penetration expected in 2002
- Internet connections: Modem: 66%, Fixed line: 21%, ISDN: 13%
- PCs (1999): 47% of all households
- Internet users/1000 inhabitants (October, 2000): 408

Range of Services, fixed line: Broadband, ISDN, billing services for businesses, on-line directories, double line services, cable TV services using fiber-optic cables, on-line shopping for telecommunications products directly from the service provider, minicall answering service and network administration aid, etc.

Mobile services: SMS services, WAP services, wireless LAN using radio waves, wireless intranet/e-mail and Internet services (including news), Satellite subscriptions, prepaid GSM cards, etc.

## **10.7 Contact information**

### **10.7.1 Major Operators/Service Providers**

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## 11 France

## 12 Germany

### 12.1 Summary

**M-commerce (or wireless e-commerce) is still in its infancy in Germany**, hampered by insufficient speed of the GSM network and displays on cellular phones that are far too small to be attractive. End-users' dissatisfaction is also partly based on false expectations raised by overly optimistic forecasts and a direct comparison of cellular phones' speed, handling and possibilities with fixed-line based internet access. In addition, security considerations concerning credit card payments still play a major role in the deployment and development of e-commerce and m-commerce alike.

**Still, expectations are optimistic**, mostly based on a positive forecast for the b2c segment: m-commerce is estimated to reach €13 billion in 2004, of which experts believe €9 billion to be realized in the consumer area, with the reminder being sales in the b2c area. These estimates are based on the assumption that, in 2004, Germany will count 29 million users of WAP phones. Estimates are that presently 47 percent of WAP users utilize m-commerce applications, a figure that is expected to increase to 80 percent in 2004. In addition, the spending pattern is expected to change significantly. While today sales per person and year amount to €10, this amount is expected to increase to €500 in 2004.

Optimism is also based on the fact that Germany counts 22 percent mobile telephony users, with still extraordinary growth rates, whereas only 13 percent of the population are hooked up to the internet via fixed lines.

### 12.2 Market Overview

#### 12.2.1 General

The market for m-commerce is still in a developing stage in Germany. Services that entail financial transactions are, with a few exceptions, still in the development or testing phase. One of the major problems is that four totally different industry branches have to grow together:

Hardware manufacturers, carriers, software developers and financial service providers have to test the compatibility of their products and services and offer user-friendly solutions for their future customers. In addition, marketing experts are researching which services the market will accept: Advertising and financial services appear to be the leading target sectors.

The large German companies are only hesitantly preparing themselves for the advent of m-commerce. While 75 percent of the large firms indicated that they are researching m-commerce potential and its impact on business models, only 29 percent are using or testing m-commerce solutions, and an additional 11 percent are planning such pilot projects. Twenty-four percent do not believe that m-commerce is relevant for their business, 10 percent are still undecided, and 25 percent have not discussed the issue yet. The affinity to m-commerce is largely dependent on the industry sector: the large automotive manufacturers, media, telecommunications providers, and the travel industry are already actively pursuing m-commerce projects. Financial services and insurance are also at the forefront. Wholesale trade and construction industry see m-commerce as irrelevant for their future business.

#### 12.2.2 Technical

The various technological standards for mobile transmission may obstruct the deployment of UMTS, which is generally seen as the most important single factor for a wide acceptance of m-



commerce. Technical alternatives, especially GPRS, which will cut the cost for WAP users, are seen by some as a threat to a fast development of UMTS technology, although by others as the ultimate test for the profitability of UMTS investments. This is especially true since the UMTS license holders, who had to pay nearly € 50 billion for their licenses, are facing enormous development costs - GPRS can use GSM equipment and technology. EDGE, another standard, will presumably not pose a threat to UMTS as it also requires new terminals and switches.

### 12.2.3 Mobile Communications

As of December 2000, 23.47 million contracts for mobile services were sold for the mobile networks, D1, D2, (both digital, 900MHz, GSM), e-plus (digital 1,800 MHz, GSM) and the analog C-Net. Carriers invested more than €2.6 billion in their networks, a figure that does not include investments for UMTS solutions. In the services segment, Vodafone (former Mannesmann) is the market leader with a 42.2 percent market share, followed by T-Mobil with 41.2 percent, e-plus 15.4 percent and VIAG with 1.2 percent.

While data transmission via cellular phones has been, so far, a task for patient users, Viag Interkom and T-Mobil have started to offer GPRS recently, and E-plus and D2-Vodafone are expected to do so shortly. GPRS transmits data three times as fast as the typical 9.6 kbit per second of present GSM technology. (Theoretically, GPRS speed is 50 kbit/s.) GPRS also changes the tariff structure, which is based on data volume rather than time spent in the network. GPRS is widely seen as the final test for both the acceptance of WAP services and, consequently, the potential return on the huge investments into UMTS. (There are some experts, however, who point out that GPRS may also be a threat to UMTS.)

More than 170 companies offered WAP services over the portals of D2-Vodafone, T-D1, Genion, Loop, E-Plus, Jamba, Freenet, Talknet, and T-online in 2000.

**Presently available services and the impacts of m-commerce: The changing face of mobile operators:** M-commerce is forcing many mobile operators to redefine their businesses and become both service and content providers. Only then they can move customers into high-value relationships, away from customer acquisition and into customer retention and ownership. This assumption is underlined by the fact that significant changes in the approach of, most noticeably, mobile operators took place recently. In the past, strategies to generate new business were based on familiar variables such as cost-per-minute, free voice mail retrieval and signal coverage. Now the focus has shifted to developing into service and content providers. This trend is, of course, triggered by the expected further reduction of revenues in the operators' core business.

Many operators are embracing the new business models that this environment demands. Experts caution, however, that there are lessons to be learned from the ISP (internet service provider) market of the nineties. There is little doubt that the influence of the ISP was a critical factor to the rapid adoption of the internet. However, often their role remained constant and many ISPs now have little impact on the actual usage of the internet. They became operators and managers of the pipes, rather than of content.

Mobile operators are apparently learning from this and move customers into high-value relationships, away from customer acquisition and into customer retention and ownership.

**Mobile devices are challenging the dominance of PCs.** The ability of mobile devices to connect to the net wherever the user is located is the most powerful argument in favor of mobile devices. They are also considered to be genuinely “personal,” which is not the case with PCs, which are collectively used in organizations, households or public places. Mobile devices are less expensive than PCs and can easily be carried by their owners. Distribution figures are already higher than the number of stationary internet connections. Recent forecasts indicate that the penetration of mobile phones may reach 83% of the Western European population – twice as much as the wired internet world.

Mobile devices already offer an infrastructure of secure hardware: **GSM mobile phones, for example, feature a slot for SIM cards, which can be used as a safe storage of private keys.**

#### 12.2.4 E-Commerce developments

The volume of e-commerce grew again in Germany in 1999 vis-a-vis 1998, particularly in the business-to-business area. The internationally very competitive areas of German industry (finance and insurance sectors, IT and trading) have largely embraced the possibilities e-commerce provides, but SME's have been much slower to adapt. One study covering 1998 estimated that 31 percent of large and internationally successful medium-sized firms (the so-called "Mittelstand") have credible e-commerce strategies, while only seven percent of smaller, domestic firms even have homepages.

**Data on the volume of e-commerce in Germany differ.** Deutsche Bank estimated that the volume of e-commerce in 1999 will quadruple from its 1998 level of €767 million. The leading industry association, the Cologne-based "eco Electronic Commerce Forum e.V.," believes the 1999 volume will reach €2.6 billion. The group forecasts that by 2003 over 75 percent of e-commerce volume will be in the business-to-business area, out of a total of perhaps €20.4 billion.

**Growth in the business-to-consumer field grew more slowly,** primarily because of cultural resistance to shopping over the internet. German consumers are still more likely to use plastic while on holiday in a less developed country than to give their credit card number to an established internet-based company. Another factor is that internet penetration in Germany remains relatively low as compared to the world leaders in Scandinavia, North America, and Australia. Finally, German telecommunications companies continue to charge internet users a flat monthly fee plus per minute access fees for local calls, making internet use more expensive than in leading internet societies.

Despite a slow start, most domestic estimates predict much faster growth, even a boom, in both the business-to-business and business-to-consumer areas in the next five to ten years. The European Information Technology Observatory (EITO) predicted in July 2000 that Germany will

become the largest e-commerce market in Europe in 2001. Other prognoses are less optimistic, but still estimate that German society will reach a critical mass in using the internet for commerce in the early years of the next century. German telecommunications infrastructure is excellent and entirely digital. Telecommunication costs are falling, more and more Germans are going on-line, especially in the 15-29 age group, and psychological barriers to an on-line society are eroding, albeit more slowly than many would like.

**Optimistic forecasts for m-commerce in the b2c field:** m-commerce is estimated to reach €13 billion in 2004 of which experts believe €9 billion to be realized in the consumer area, with the reminder being sales in the b2c area. These estimates are based on the assumption that, in 2004, Germany will count 29 million users of WAP phones. Estimates are that presently 47 percent of WAP users utilize m-commerce applications, a figure that is expected to increase to 80 percent or 60 million participants in 2004. In addition, the spending pattern is expected to change significantly. While today sales per person and year amount to €10, this amount is expected to increase to €500 in 2004.

Whether the optimistic scenario prevails will depend largely on whether the German parliament, government agencies and courts translate rhetoric into e-commerce friendly policies. This in turn will require resolving lingering questions on digital signature, taxation, data privacy, and copyright protection.

#### 12.2.5 Internet and Online Services

Germany still lags behind the United States in internet access and e-commerce activities, but the number of web-users is expected to grow from 16 million in 1999 to 32.9 million in 2003, a compounded annual growth rate of 27.3%. Similarly, the number of web-buyers - those that conduct e-commerce within a period of 3 months, is expected to grow from 2.7 million in 1999 to 8.6 million in 2003, a compounded annual growth rate of 47.4%. IDC also states that Germany has the highest number of web-users and web-buyers within the European Union.

The three biggest German internet service providers (ISPs) are DTAG (T-Online), AOL Bertelsmann AG, and CompuServe Deutschland. At the end of 2000, they counted more than 5.8 million subscribers. Among the big three, AOL experienced the largest growth in subscription in 1999, 70% as compared to 37% for T-Online and less than 1% for CompuServe. While previously high telephone tariffs have deterred internet usage, ISPs have introduced new pricing plans to target different segments. In addition, Telecom operators such as DTAG and Mannesmann offer special rates to their ISDN and DSL customers through service packages.

About 17 million German households are equipped with computers, and experts estimate that in the year 2000, about 27 percent (14 million) of all households will have internet access. Germany boasts about 1,000 providers of direct internet connections. Growing acceptance of this medium can also be evidenced by an increasing market volume of services for interactive computing, TV sets and internet access, which is projected to rise to €4.4 billion in the year 2000, up from €2.96 billion in 1998.

Booz Allen Hamilton estimates that business had invested €1.91 billion in net access by mid-1999 and that 40 percent of all German companies will soon have internet sites.

#### 12.2.6 Initiatives attempt to boost Germany's internet and e-commerce presence

**"D21 Initiative"** The slow pace of internet use and e-commerce growth prompted industry concern that Germany would fall further behind the world's leading electronic trading nations.

IT industry CEOs became so worried about existing laws they perceive to be restrictive and the continuing, unresolved debate over essential elements of the framework in which e-commerce must operate that they formed the "D21 Initiative" to put e-commerce issues much higher on the national political agenda. Several of the forerunners in this effort are the CEO's of leading U.S.-based IT and telecom firms. This initiative follows several other high-level campaigns in recent years that have not had the effects their organizers intended.

**Bertelsmann Internet Content Conference:** The influential Bertelsmann Foundation capped its year-long effort to find an answer to the still not entirely answered question of how to regulate internet content without stifling its growth by holding a major international conference in Munich in mid-September. While the conference was not empowered to "decide anything formally," the Bertelsmann effort mobilized the world's most influential thinkers and actors on internet policy and made much headway in developing guidelines to govern internet content based on "e-commerce friendly" principles of self-regulation and using filters.

**Germany's "Road to the Information Society" Program:** This 150-page document sketched the broad framework by which the government hopes to transform Germany into an information society and to introduce e-commerce into the procurement process and other government operations to make it leaner and more efficient. Observers generally lauded this effort but many noted that it was "too little and a little late" and remained skeptical that it will be able to change the culture. Some German IT executives maintain that many German officials responsible for IT policy do not yet personally "live in the information age," so do not "live its problems."

### **12.3 Competitive Situation**

Some experts point out that Europe may be two to three years ahead of the United States in the m-commerce field, because of the GSM standard, which provided all players with the same platform – different from the United States, where more than one standard for mobile telephony is being used. Others maintain that the United States, based on its e-commerce experience, where it is about three years ahead of Europe will be able to close this development gap in m-commerce applications, solutions and offers very fast.

The rapid acceptance of SMS-messaging services and the accompanying increase in the use of cellular phones in Germany, especially among the younger population gives room for optimism for m-commerce in the near future, which may be hampered only by a shortage of WAP-phones and secure transaction venues.

### 12.3.1 Best Prospects

Easy identification, localization and personalization of information and commercial offers are the strengths of m-commerce systems. These are also reflected in the best prospect areas for m-commerce applications:

News, weather forecasts, sports, E-mail/SMS and financial services are presently the areas most in demand. Good potential is also forecast for services whose marketing can be personalized, travel and transportation and construction information and, provided security issues are being solved, financial services. In this segment, banks expect standardized transactions to increase from 3 to 12 percent. Within the financial services area, partnering seems to be easier and happening faster in the m-commerce than it took place in e-commerce. Major players have become more flexible; mobile carriers, and hardware and software companies appear to be best suited to become partners of financial institutes. The majority of all sales will be realized via virtual marketplaces and total sales are said to reach €4 billion in 2004. Presently, however, only a few m-commerce companies are reaching sales of more than €5,000 annually.

### 12.3.2 Opportunities for market players

The following provides a short overview on the various groups that are involved and can benefit from m-commerce:

*End-users:* Stock investors and analysts, traveling sales people, purchasing agents, craftspeople, service technicians, concert-goers, and e-shoppers in general.

*Content providers:* Banks, stock brokerages, ticketing vendors, information services and administrative services all provide services that lend themselves particularly well to m-commerce solutions.

*Software providers*

*Players providing infrastructure:*

Authentication services: Trusted Third Parties The process of digitally validating identities requires the service of independent agencies that enjoy the trust of the participants. Most of these services are related to the generation, storage and distribution of digital certificates, but there are also other services, such as date/time stamping, archiving, and notary services that will find a waiting market. Trusted Third Parties (TTPs) are:

- Certification Authorities responsible for certifying the ownership of public encryption keys.
- Registration Authorities (RAs) verify identities for the CA before a digital certificate is issued
- Issuing Authorities, which are the sole owner of one or more PKIs

*Mobile Network Operators - Share of voice:* From retailers to financial service providers, a large number of organizations are looking to widen their delivery channels to include not just fixed internet but wireless; in essence allowing users to connect, communicate and transact via the mobile handset.

*Mobile device manufacturers:* The importance of the mobile handset must not be underestimated. Its unique portability makes it the perfect payment device even for multi-channel e-commerce environments - a user can surf the internet on a PC or even digital TV and make a final payment for goods or services using his phone. Whatever its place and no matter how it is used, all of the factors listed in this brief article point to one thing: With the correct

approach, the mobile operator, and the mobile phone, will remain central figures in the forthcoming mobile commerce explosion.

### *Help Desk Services*

### *Security device manufacturers*

#### 12.3.3 Concerns: Security

Payment security is often cited as the number one obstacle preventing the widespread uptake of mobile commerce. Real-world transactions use face to face contact and hand written signatures to achieve legally binding contracts or to approve a financial transaction. On the internet, these functions have to be replicated. This can be achieved through Public Key Infrastructure (PKI), a technology that uses matching asymmetric key pairs to achieve the four key principals of a secure internet:

*Authentication* – Transaction parties provide proof of their identity.

*Confidentiality* - Using encryption increases confidentiality.

*Integrity* – Message is protected against tampering.

*Non-repudiation* – The sender of the message cannot later deny sending the message.

Traditionally a security solution for fixed networks, PKI is now migrating to wireless environments (WPKI – wireless PKI). A user's private key, central to the security of the infrastructure and the enabling feature for authentication and encryption, can now be stored on a SIM card. The inherent strength of the SIM against brute force attacks makes it the perfect tamper-proof device for the storage of these keys. Once embedded in the device the phone allows the user the same functionality as is possible on the fixed internet, with authentication, confidentiality, integrity and non-repudiation. With this functionality in place, the ability to conduct secure transactions over the phone and electronically "sign" for goods, becomes a reality.

Within any PKI lies the need for a Certification Authority (CA), a central and trusted body, responsible for the issuance of users' key pairs and digital certificates (an online equivalent of a passport), their revocation and overall usage within a transactional environment. Again, with ownership of the mobile users' SIM cards and an existing billing infrastructure the mobile operator is perfectly positioned to accept this role as the central body within the m-commerce universe.

#### *12.3.3.1 Legal Background - EU*

The legal structures that are needed to take advantage of the PKI-based security are in place. The EU has issued a European Electronic Signature Directive, and the individual EU member countries are now in the process of implementing this framework into national law. Main points of the Electronic Signature Directive are:

- *legal recognition*: an electronic signature cannot be legally discriminated against, solely because it is in electronic form
- *free circulation*: all products and services related to electronic signatures can circulate freely; members states cannot make the provision of services related to electronic signatures subject to mandatory licensing
- *liability*: the legislation establishes minimum liability rules for service providers
- *technology-neutral framework*: the legislation provides for legal recognition of the signature regardless of the technology used

#### *12.3.3.2 Legal Background – Germany*

The Digital Signature Law came into effect on August 1, 1997. The government has also issued a Digital Signature Ordinance to implement the Digital Signature Law. This ordinance sets out requirements and responsibilities for certification authorities as well as minimum requirements for the technical components that are used to create digital signatures.

The certification authority of the German Regulatory Authority for Telecommunications and Post (Regulierungsbehörde fuer Post und Telekommunikation – RegTP) began operations in September 1998. This office certifies private CAs. (For contact information, please see “Contacts” below.)

#### *12.3.3.3 Regulatory framework - REGTP*

The regulatory authority for telecommunications (Regulierungsbehörde für Telekommunikation und Post) was set up to ensure implementation of the telecommunications act. The RegTP was to a large extent modeled on the U.S. Federal Communications Commission; it is the agency that grants licenses, assigns and supervises frequencies, imposes universal service obligations, controls network access and interconnection and approves or reviews tariffs. The regulator plays a crucial role for the functioning of a liberalized market. The agency is set up as an independent government body, which is supervised by the German Federal Economics Ministry.

In addition to the enforcement of telecommunications laws and licenses, the regulatory agency has also set up an Electronic Signature Policy Certification Authority, from which certifying authorities can obtain their key certificates, enabling them to assign signature cards to users.

In its website (<http://www.regtp.de>), the regulator states that its most important tasks are securing fair competition, the necessary technical cooperation of suppliers and prevention of discrimination, and a sufficient and nation-wide supply of telecommunications services. In order to allocate frequencies (their supply being limited), the regulator has been holding auctions and competitive bidding. Licenses are required for the operation of transmission paths and for voice telephony for the public, provided over self-operated networks. Consequently, providers of data or multimedia services on leased lines and resellers do not need a license.

To apply for licenses, one may download application forms from the regulatory agency's website. A complete listing of licensees is also available from the website.

For voice telephony and transmission paths, 627 licenses were granted in 1999. These 627 licenses are held by a total of 252 different companies. The total number of companies, which provide telecommunications services in Germany has grown to more than 1,700. Most recently, the RegTP held a UMTS spectrum auction in July 2000. A total of 145 megahertz were awarded to six telecom groups, an equivalent of 12 frequency blocks, with each group purchasing two frequency blocks and a license for 20 years.

The German telecommunications market has been fully liberalized since January 1, 1998. Fixed-line telephony was the last stronghold of the former monopoly holder Deutsche Telekom AG (DTAG) - the mobile segment had already been opened to competition in 1993, and value-added services were open to competition even earlier. Currently, DTAG must provide its competitors with access to all essential services and facilities it uses itself or offers in the market, which means that DTAG must also provide access to the local loop for an interconnection fee.

## 12.4 Statistical Information

### 12.4.1 Table 1: Telecommunications Market in Germany (in €million)

	1997	1998	1999*	2000*	98/97 (%)	99/98 (%)	00/99 (%)
Fixed line	21,858	22,225	22,173	21,833	1.7	-0.2	-1.5
Mobile	5,085	6,713	8,592	10,311	32.0	28.0	20.0
Switched data & leased line	5,308	5,734	5,927	5,938	8.0	3.4	0.2
Internet and Online	1,532	1,982	2,724	3,825	29.4	37.4	40.4
CaTV	1,634	1,782	1,897	2,036	9.0	6.4	7.3
Carrier	35,418	38,436	41,314	43,943	8.5	7.5	6.4
<b>Total</b>	<b>44,580</b>	<b>48,605</b>	<b>53,400</b>	<b>58,180</b>	<b>9.0</b>	<b>9.9</b>	<b>9.0</b>

(Source: EITO 2000)

### 12.4.2 Table 2: Telecommunications market in Germany (in \$ million)

	1997	1998	1999*	2000*
Fixed line	19,672	20,003	19,956	19,650
Mobile	4,577	6,042	7,733	9,280
Switched data & leased line	4,777	5,161	5,334	5,344
Internet and Online	1,379	1,784	2,452	3,443
CaTV	1,471	1,604	1,707	1,832
Carrier	31,876	34,592	37,183	39,549
<b>Total</b>	<b>40,122</b>	<b>43,747</b>	<b>48,060</b>	<b>52,362</b>

Exchange rate: \$ 1 = €0.9 (All calculations are based on €)

### 12.4.3 Table 3: Mobile Voice Market

**1998                      1999                      2000**



Users (in millions)	13.9	23.5	48
Penetration (percent)	17.0	28.6	58.5

(Source: RegTP 2000)

#### 12.4.4 Table 4: Cellular phones per 100 inhabitants in Germany, 2000

(Source: Bitkom)

#### 12.4.5 Table 5: Reasons for Using WAP (Source: FORIT)

#### 12.4.6 Table 6: What Users Want to Pay For via Cellular Phone (Source: FUNKSCHAU)

### **12.5 Contacts**

#### 12.5.1 Regulator

Regulierungsbehoerde für Telekommunikation und Post  
 (Regulatory Agency for Telecommunications and Post)  
 Tulpenfeld 4, 53113 Bonn  
 Tel: [49][228] 140  
 Fax: [49][228] 148872  
 website: <http://www.regtp.de>

#### 12.5.2 Mobile Operators

DeTeMobil Deutsche Telekom Mobilnet GmbH  
 Landgraben 151  
 53227 Bonn  
 Tel: [49][228] 936-6400  
 Fax: [49][228] 936-6409

Vodafone Mobilfunk GmbH  
 Am Seestern 1  
 40547 Duesseldorf  
 Tel: [49][211] 533-2302  
 Fax: [49][211] 533-2304

E-Plus Mobilfunk GmbH & Co. AG  
 E-Plus-Platz 1  
 40468 Duesseldorf  
 Tel: [49][211] 448-3233  
 Fax: [49][211] 448-3244

VIAG Interkom GmbH & Co. AG  
80260 Muenchen  
Tel: [49][89][2442-3500]  
Fax: [49][89][2442-4236]

### 12.5.3 Mobile Shop Systems supporting WAP

OpenShop [www.openshop.de](http://www.openshop.de)  
Intershop [www.intershop.de](http://www.intershop.de)

### 12.5.4 Mobile Data Services – SMS providers

[12sms FastConnectGmbH  
www.12sms.de](http://www.12sms.de)

Brodos AG: [www.brodos-sms.de](http://www.brodos-sms.de)

Vodafone D2: [www.d2-message.de](http://www.d2-message.de)

Debitel: [www.debitel.de/privat/mobilfunk](http://www.debitel.de/privat/mobilfunk)

graap new media GmbH: [www.dialing.de](http://www.dialing.de)

SMS-infowelt AG: [www.sms-infowelt.de](http://www.sms-infowelt.de)

E-Plus Online: [www.eplus-online.de/NASApp](http://www.eplus-online.de/NASApp)

Minick AG: [www.free-sms.com](http://www.free-sms.com)

Free-SMS.de: [www.free-sms.de](http://www.free-sms.de)

Viag Interkom: [www.genion.de/sms/index.html](http://www.genion.de/sms/index.html).

Handy.de: [www.handy.de](http://www.handy.de)

Iobox.de: [www.iobox.de](http://www.iobox.de)

Schnaepchenjagd.deGmbH: [www.powersms.de](http://www.powersms.de)

sms-channels.de: [www.sms-channels.de](http://www.sms-channels.de)

ZET.NET.AG: [www.sms.kostenlos.de](http://www.sms.kostenlos.de)

StarWap AG: [www.starwap.de](http://www.starwap.de)

T-Mobil: [www.t-d1/kunde/sms](http://www.t-d1/kunde/sms)

### 12.5.5 WAP Services (portals and selected providers)

Deutsche Telekom T-D1: [www.t-motion.de](http://www.t-motion.de)

D2 Vodafone: [d2wap.de](http://d2wap.de)

E-Plus: [www.eplus.de/NASAapp](http://www.eplus.de/NASAapp)

Viag Interkom  
wap.loop.de

Jamba: [www.jamba.de](http://www.jamba.de)

T-Online: [www.wap.t-online.de](http://www.wap.t-online.de)

Talkline: [www.talkline.de](http://www.talkline.de)

Mobilcom: [www.freenet.de](http://www.freenet.de)

Amazon.de GmbH: [www.amazon.de/mobil](http://www.amazon.de/mobil)

Bol Medien GmbH: [www.wap.bol.de](http://www.wap.bol.de)

Deutsche Boerse AG: wap.exchange.de

Deutsche Bahn AG.: wap.bahn.de

eBay GmbH: wap.ebay.de

FOCUS Online GmbH: [www.focus.de/wap](http://www.focus.de/wap)

ZDF: wap.zdf.de

Lycos Bertelsmann: [www.lycos.de](http://www.lycos.de)

Yahoo! Deutschland GmbH : wap.yahoo.de

#### 12.5.6 Associations

Verband der Anbieter von Telekommunikations- und Mehrwertdiensten  
(Association of the providers of telecommunications and value-added services)  
Oberlaender Ufer 180-182  
50968 Koeln  
Tel: [49][221] 37677-24  
Fax: [49][221] 37677-26  
Web: www.vatm.de

BITKOM  
Albrechtstraße 10  
10117 Berlin  
Tel: [49][30] 275760  
Fax: [49][30] 27576400  
Web: www.Bitkom.org

#### 12.5.7 Trade Shows

International trade shows in Germany are an ideal forum for U.S. companies to market their products. In contrast to many North American trade shows, the typical German fair is much

larger, represents virtually the entire industry, and is a highly successful sales point. German trade shows are an excellent contact point for American firms interested in penetrating the markets of Germany and the European Union.

**Event: CeBIT/International Trade Fair for Office, Information & Communication Technology**

Location: Hannover

Frequency: Annual

Organizer: Hanover Fairs USA  
103 Carnegie Center

Princeton, NJ 08540

Phone: (609) 987-1202

Fax: (609) 987-8810

<http://www.hfusa.com>

Description: The world's largest trade show for telecommunications, networks/connectivity, banking, data communications, software, hardware, peripherals, e-commerce products/solutions and OEM products.

**Commercial Service Contact:**

Volker Wirsdorf

Commercial Service

U.S. Consulate General

Siesmayerstrasse 21

60323 Frankfurt

Tel: [69] 956 204 0

Fax: [69] 561114

Email: [volker.wirsdorf@mail.doc.gov](mailto:volker.wirsdorf@mail.doc.gov)

## 13 Greece

## 14 Hungary

### 14.1 Summary

M-commerce in Hungary is still in its formative stages due to several factors: the slow speed of the GSM network, small displays of the mobile phones, and security considerations for credit card payments. GPRS technology is in an experimental phase with GSM service providers. UMTS technology is not expected to be implemented before 2003. All three currently operating GSM service providers in Hungary (Westel, Pannon and Vodafone) offer WAP services. There were 3.1 million mobile phone subscribers at the end of 2000 with 185,000 WAP enabled phones. Mobile phone penetration is expected to reach 55 percent in 2004 and 65 percent in 2009.

### 14.2 Market Overview

Mobile telephony has developed in Hungary much faster than ever expected either by the mobile phone concession holders or the government. With 3 million subscribers at the end of 2000, mobile phone penetration is 30 percent of Hungary's total population of 10 million people. Due to a number of factors, including high prices for fixed landlines, the number of mobile phone

subscribers may soon exceed the number of fixed-line subscribers in Hungary during the third or fourth quarter of 2001.

There are three companies but four mobile service providers in Hungary: West radiotelephone Co. Ltd. (analog) and Westel 900 (both Westel companies), Pannon GSM, and Vodafone. Westel Radiotelephone Co. Ltd. was established in 1990 and operates a 450 MHz mobile cellular communications system. In 1993, two concessions were issued for 900 MHz digital (GSM) cellular systems to Westel 900 and Pannon GSM, both of which started operations in 1994.

In October 1999, a concession contract was signed with a consortium called Vodafone to provide mobile phone services on 1800 MHz. Vodafone started services on November 30, 1999. Later, both Westel 900 and Pannon GSM were granted concessions by the government to provide 1800 MHz services once Vodafone's twelve-month monopoly period had ended in December 2000.

The mobile telephony market leader, Westel 900, had 1,559,200 subscribers at the end of 2000 - increasing the number of its subscribers by 90 percent just in one year. Pannon GSM raised the number of its subscribers by 84 percent to 1,216,968. Vodafone's subscribers increased to 184,225.

Westel's MegaPress service offers mobile news on traffic, weather, entertainment, sport, the lottery and other games and entertainment including, horoscopes, name days, birthdays, etc. In cooperation with Reuters Magyarorszag Kft., a Reuters GSM Terminal is available to provide valuable financial information in a GSM telegram. Data are classified into eight main groups. Sending a short GSM telegram may access the following information in English and in Hungarian:

- share prices of Hungarian shares traded on the Budapest Stock Exchange, the New York Stock Exchange or various other European stock exchanges
- stock exchange indices (INDEX)
- interbank offered deposit rates (IBOR)
- bid/ask yields of government bonds issued by 5 countries (BOND)
- forex (foreign exchange) cross rates (CROSS)
- interbank forex rates against the Hungarian Forint (FX)
- official mean rates of exchange (fixing) of the National Bank of Hungary
- future rates (FUTURES)

Westel concluded agreements with many banks in Hungary (including OTP, Budapest Bank, CIB and Inter-Europa Bank) whereby Westel clients can collect information via SMS about the state of their accounts. In case of the bank called OTP, even information on exchange rates, investment bonds and stocks are available. A new service of Westel is called SMSBroker, which is in effect an automated stockbroker agency that allows for non-stop coverage of the Budapest Stock Exchange. This Westel service also provides the capability of buying and selling shares at any moment. An application called SIM Toolkit is downloadable to compatible SIM cards.

The service is provided in cooperation with Equitas Broker Rt. ([www.equitas.hu](http://www.equitas.hu)) and Fornax Rt. ([www.fornax.hu](http://www.fornax.hu)).

Westel also introduced in January 2001 a WAP navigator service for the territory of Budapest and the surrounding 78 communities. Westel subscribers are also able to purchase beverages from selected Coca-Cola dispensing machines using their WAP telephone.

Vodafone WAP services include news, finance (economic news, information on stocks, the Budapest Stock Exchange Index, International Stock Exchange Indexes, currency rates of the Hungarian National Bank), entertainment (cinema, TV programs etc.) games, sports, and information on flight arrivals and departures.

The latest services of Pannon GSM include e-mail management, Navigator (providing important destinations; banks, post offices, pharmacies, ATM machines, Police, medical and emergency care facilities, restaurants, and auto repair shops – all in the vicinity of the caller), traffic guidance for public transportation and an optimal travel itinerary while using a car. This service covers the territory of Budapest and its suburbs – again greater Budapest.

According to a survey made by TNS Modus, Hungarian WAP users would mostly like to use the news and information services. Their preferences for future services are calendar, personal organizer and a “to do” list.

### **14.3 M-commerce technologies**

All three GSM service providers offer WAP services. Out of the 3 million GSM mobile phone subscribers 185,000 have WAP phones. In 2002, a minimum of 85 percent of the new phones will be WAP enabled and are expected to total 950,000. (The projected number of mobile telephony subscribers for 2002 is predicted to reach 3.9 million.) From 50-70 percent of WAP phone owners use WAP often. The typical WAP user is mostly a male, who is an early adapter, works in IT, telecommunications or other hi-tech sector, and uses the Internet daily. About 40 % of these people already purchase on the Internet, and 20 percent of them use SMS based mobile banking services.

Westel Mobile Telecommunication Rt. plans to introduce General Packet Radio Service (GPRS) during 2001. The quick introduction of this new technology is hindered by the fact that the technology is not yet mature and there is a lack of mobile phones on the market for this particular technology. The test system is based on Ericsson technology, using Ericsson, Motorola and Mitsubishi terminal equipment. Westel is going to spend 10 billion Hungarian Forints HUF (\$36 million) for the introduction of GPRS services during the next two years. Westel signed a network development framework agreement (\$52 million) with Ericsson in February, 2001 providing network equipment that will allow Westel to offer a wider range of services including greater availability of GPRS services in the entire Budapest network and 70 percent of its national network.

Pannon GSM extended its long-term general agreement with Nokia, first signed in February 1997. The value of the new agreement is over \$ 50 million for 2001. Under the extended contract, Nokia will continue to supply network infrastructure including Nokia switching centers, third-generation (3G) base stations and Nokia UltraSite base stations. Nokia UltraSite supports GSM, HSCSD and GPRS, as well as 3G technologies EDGE and WCDMA. According to an earlier statement by Pannon GSM, GPRS technology will be supplied by Ericsson.

Bids for the 3G mobile phone system UMTS are likely to be invited in 2002. Dresdner Kleinwort Benson's (DrKB) analysis of the telecommunications industry in Hungary places the tender date around the second half of 2001 or early 2002. DrKB adds that, to date, Hungary has not adopted a clearly defined policy regarding 3G licenses. DrKB predicts there will be three winners of UMTS licenses. The consulting firm noted that the market would not be attractive for a fourth player, considering the relatively late date of the tender and the fact that the high-end market is fully penetrated in Hungary. According to DrKB's forecasts, fees for the licenses would be approx. \$63-133 million per license.

#### **14.4 Competitive analysis**

European equipment manufactures (Nokia, Ericsson) dominate the market, with Nokia being the market leader. Nokia is the main supplier of Pannon GSM and Vodafone, whereas Ericsson has stronger positions with Westel 900. Motorola has to compete in this environment. Motorola plans to have a 13-15 percent market share of mobile phone handsets. In the field of smart cards the major European suppliers are all present: Bull, Schlumberger, Gemplus etc.

#### **14.5 Hungarian Statistical information**

Main phone lines: 3.7 million (at the end of 1999)  
Number of mobile phone subscribers: 3 million  
Mobile penetration: 30 percent  
Regular Internet users: 750,000  
Internet Penetration: about 7 percent  
Number of dial-up Internet subscribers: 120,000  
Number of households with a computer: 300-350,000  
Number of ISPs: 30  
B2C e-commerce: \$ 3.5 million in 2000  
B2B e-commerce: \$ 11 million in 2000

#### **14.6 Contact information**

Communications Authority of Hungary  
Mr. Gabor Frischmann, President  
Mr. Gyula Sallai, Vice President  
Mr. Laszlo Vojnar, Vice President  
Mrs. Zita Takacs-Vaczi, Vice President  
P O Box 75  
1525 Budapest, Hungary  
Tel: (36 1) 375 7777 Fax: (36 1) 356 5520  
e-mail: frischmann@hif.hu  
sallai@hif.hu  
www.hif.hu

Pannon GSM (Skandinavian JV for 900 MHz mobile service)  
Mr. Bjorn Flakstad, Managing Director  
Mr. Gyozo Drozdy, Director of External Affairs and Strategy

Ms Anette von Koskul, Marketing Director  
Baross u. 165.  
2040 Budaors  
Tel: (36 1) 464 6000  
Fax: (36 1) 464 6100  
www.pannongsm.hu

WESTEL Radio Telephone Ltd.  
Mr. Norbert Jecsy, Managing Director  
Husztí u. 32.  
1033 Budapest  
Tel: (36 1) 265 8599 (direct) or 265 8200 Fax: (36 1) 265 8417  
Dr. Istvan Galfi, Technical Director  
Tel: (36 1) 265 8242 (direct) Fax: (36 1) 265 8414  
e-mail: Istvan.Galfi@westel.hu  
www.westel.hu

Westel Mobile Telecommunication Co. Ltd.  
Mr Andras Sugar, Director General  
Mr. Janos Winkler, Dep. Dir. Gen.  
Kaposvar utca 5-7.  
1117 Budapest  
Tel: (36 1) 265 9000 Fax: (36 1) 204 4126  
e-mail: sugara@westel.hu  
www.westel.hu

Vodafone  
Mr. Attila Vitai, CEO  
Váci ut 1-3.  
West-End City Center  
H-1062 Budapest  
Tel: (36-1) 475 1475 Fax: (36-1) 475 1476  
e-mail: attila.vitai@vodafone.irisz.hu  
www.vodafone.hu  
14.7

## 15 Ireland

## 16 Italy

### 16.1 Summary

Italy is the world's sixth largest industrialized economy and Europe's fourth largest market for information and communications technology. Mobile communications' penetration rate is 60%, one of the highest in Europe. Once wireless commerce is perfected Italy, given the high penetration of cell phones, would seem to be a logical consumer base and growth market for m-commerce. For the moment, the poor acceptance of Wireless Application Protocol (WAP) services has severely dampened expectations. Close attention will be paid to Internet-enabled General Packet Radio Service (GPRS) usage, as the performance of GPRS is expected to



indicate the future popularity of the third-generation Universal Mobile Telecommunications Systems (UMTS) services and, to a great extent, the success of mobile commerce.

Market analysts monitoring m-commerce in Italy agree that the sector will eventually experience boom conditions but cite, among others, the need for improved order processing or call centers, better delivery systems, a serious campaign to spread the use of credit cards, and software encryption that assures consumer safety.

The need for specialized skills to implement m-business strategies will lead Italian companies to resort to external consulting, and excellent opportunities exist for American systems integrators and service providers offering strategy, marketing, design and technical services.

## **16.2 Market Overview**

Italy is one of the best-positioned countries in Europe for mobile commerce. With high mobile penetration rates of 60%, which account for more than 32 million subscriptions. Italian operators view mobile as the key channel to market Internet-related services and business-to-consumer services in Italy. According to European Central Bank statistics and Eurostat, Italy is third in Europe in terms of mobile phone usage: 526 mobile phone subscriptions per 1,000 inhabitants (vs. 317 mobile phone subscribers per 1,000 inhabitants in the United States). 31 percent of cellular phone users are under the age of 24, a higher percentage for that age than in the rest of Europe.

The main factors fueling the development of m-commerce in Italy will be:

1). increasing recognition of m-commerce as a means to access customers, particularly among the well-educated, affluent and upwardly mobile consumers; 2) improved consumer protection legislation; 3) Italian legislation which recognized the legal validity of digital signatures and digital contracts; 4) agreements between Italian banks and credit card operators to introduce secure electronic transaction protocol.

### Major Obstacles

M-commerce growth in Italy is expected to face several obstacles:

- traditional person-to-person buying;
- cultural biases against non-cash transactions as the vast majority of Italians use only cash or debit cards which cannot be used for on-line purchases;
- security concerns for sending credit card information through the Internet;
- privacy concerns as Italians fear that corporations are collecting data on consumers;
- slow, unreliable and expensive postal service and a small number of private delivery companies;
- taxation issues: Italy has indicated that it will follow European Union directives on Internet taxation, and supports in principle the idea that non-European companies must collect value-added tax. Some Italian companies are, therefore, reluctant to engage in business with firms, particularly non-EU firms, where different laws and regulations may apply; and
- shortage of skilled workers: The University of Bocconi in Milan estimates that by 2002, Italy will have a shortage of 215,000 IT professionals, which are estimated to cost the industry about \$4 billion in terms of lost revenues.

## Business to Consumer Transactions

According to the Boston Consulting Group and IDC Italia, Business-to-Consumer transactions via the Internet are estimated to account for 0.6% of the total retail trade (vs. 2.8% for the United States). As of November 2000, 6,000 firms retailed on-line. These should grow to 10,000 by May 2001, an increase of 310% on a yearly basis. Total revenues for 2000 are estimated at \$39 million, representing a growth of 270% over 1999. The market is fragmented: the top 20 on-line shops account for 65% of the total market. Overall, none of the companies reported profits from their e-commerce transactions considering that substantial investments in marketing and advertising, which accounted for one-quarter of their operating costs, had to be made. (Additional information on: [www.shoplab.it](http://www.shoplab.it)).

## Major Drivers

4 percent of all traded securities, a share that might increase to 20 or 30 percent in the next two or three years are estimated to be traded on line. It is expected that the number of clients utilizing on-line trading services will grow from 200,000 in the year 2000, to 450,000 in 2001, and to 700,000 in 2002. Total investments in stocks and bonds are expected to rise from \$4 million in the year 2000, to \$22.5 million in 2001 and to \$19 million in 2002. Customers' orders are increasingly being made from mobile phones but no separate estimates are available. The possibility of accessing financial markets through WAP technology is considered the major driving force.

## Key-Players – Telecommunications Providers

Four mobile phone operators provide TACS and GMS services:

- Telecom Italia Mobile, the cellular division of Telecom Italia, is the biggest mobile phone operator in Europe with 19.2 million subscribers in Italy and 15.8 million more across Europe via its interests in other companies. The company launched WAP services in May 2000 and signed an agreement with Yahoo!, the Internet portal, to provide content for its WAP phone service. Through the portal, TIM subscribers access e-mail, news, sport and weather channels and its e-commerce site. TIM is also positioning itself as the authentication center with Bluetooth, and is expected to launch GPRS services in the summer of 2001. (Further information on website: [www.tim.it](http://www.tim.it))

- Omnitel is owned by the Vodafone Group, and is the second-ranking cell phone company. Omnitel reached 14.9 million customers during 2000, and on November 15, 2000, was the first mobile operator to launch GPRS in Italy and in Europe. The integration of cellular telephone and the Internet resulted in an agreement with various municipalities to supply end-user information. (Further information on: [www.omnitel.it](http://www.omnitel.it))

- WIND, the only Italian provider to offer fixed, mobile and Internet connection convergence, is owned by power company ENEL and France Telecom. With a total of 4.9 million subscribers, WIND is Italy's third-largest telephone company. (Further information on: [www.wind.it](http://www.wind.it))

- The Blu consortium, which includes the Italian highway corporation Autostrade, British Telecom, multimedia mogul Mediaset and other smaller partners, began offering GMS services in May 2000. With 900,000 customers as of January 2001, Blu is planning to invest \$300

million in Internet-enabled phone services over the GMS and to introduce GPRS technology during 2001. (Further information on: [www.blue.it](http://www.blue.it)).

In October 2000, the Ministry of Communications awarded five UMTS licenses to five bidders: Telecom Italia Mobile, Omnitel, and Wind, and to two new entrants: H3G (formerly known as Andala) and IPSE. Although a contestant in the auction, Blu withdrew from bidding. A court recently ruled that Blu would not be prevented from joining one of the five UMTS license winners. UMTS services are expected to be available in the year 2002.

### **16.3 M-Commerce Technologies**

M-commerce applications for small mobile devices are limited today but market researchers predict a rosy future. Shortage of WAP handsets and shortage of Internet content need to be overcome before mobile users start connecting to the net more frequently. In the meantime, SMS (Simple Text Messages) sent over digital wireless networks, have soared in number. According to the Telecommunications Industry Association, more than 200 million messages traveled the airways in Italy in December 1999. The increasing demand for information on the move, such as news, stock market information, sporting results and advertisement is stimulating growth. With the advent of new high-speed, content-rich data services, integrated with the Internet, wireless data could reach 20 percent of the total mobile traffic market.

As elsewhere, the performance of WAP services and sales of WAP-enabled handsets in Italy has not been up to expectations. The introduction of General Packet Radio services (GPRS) in Italy during 2001 is drawing industry attention not only because of the poor performance of WAP services but also because they should provide an early indication of the acceptance of the forthcoming third-generation UMTS services. (See: Key Players)

### **16.4 Competitive Analysis**

The domestic market relies heavily on the expertise of foreign companies. European firms that specialize in developing secure solutions for mobile devices are well placed to satisfy local demand. Finland's Sonera SmartTrust, Germany's Brokat and Ireland's Baltimore Technologies are leaders in the development of PKI, Public Key Infrastructure, which uses strong encryption to guarantee confidentiality and digital signatures to ensure authenticity.

Japan is expected to be the first to introduce third-generation networks, and Europe is a key testing ground for mobile Internet services. Asian and U.S. companies are understandably anxious to win market share. California-based Airflash, which sells the platforms mobile operators need to offer location-sensitive services and mobile commerce, estimates that as much as 70 percent of its business will come from the European market over the next few years. U.S. companies will be competing with European firms such as Finland's Wapit and Germany's Materna, which provide operators with mobile application platforms and companies that market platforms to handle billing for transactions over mobile phones, such as Finland's More Magic or Ireland's Sepro.

Security is one of the major concerns of Italian companies and consumers for m-commerce transactions. Verisign of the U.S. and its Italian affiliate, Trust Italia will be selling PKI, Public Key Infrastructure in Italy, Switzerland and Croatia beginning February 2001.

## Position and Prospects of U.S. Companies

Consulting services to assist companies in developing e-business strategy and custom development service for m-commerce in the areas of marketing, sales, post-sales and purchasing are expected to boom in the next two years. Excellent opportunities exist for new-to-market U.S. companies willing to team up in cooperative agreements with well-established local firms.

California-based Airflash estimates that as much as 70 percent of its business will come from the European market over the next few years. U.S. companies will be competing with European firms such as Finland's Wapit and More Magic, Germany's Materna, and Ireland's Sepro.

### **16.5 Statistical Information**

#### **What Italians Buy On Line**

(Source: European Commission, Politecnico University of Milan; Ipsos-Explorer; Onetone Research; Doxa)

	%
Books and CD's	43.7
Computer Equipment	36.7
Tourism packages	11.8
Tickets to cultural events	6.8
Clothing	6.3
Gifts	6.2

#### **Breakdown by Age of Italians who have bought products on-line**

Under 24	16%
25-35	35%
35-44	26%
45 and over	23%

#### **WAP-enabled handsets currently in use in Italy (Source: Blu)**

Nokia 7110	12,601
Nokia 6210	5,349
Siemens S35	11,501
Ericsson R320s	4,831
Ericsson R380s	877
Sagem MW930	6,988
Alcatel View Wap	49,804
Motorola T260	874
Total	92,825.

## **17 Luxembourg**

## **18 The Netherlands**

### **18.1 Summary**

The Netherlands market for Mobile Internet and M(obile)-Commerce represents a new, emerging market. The Dutch M-Commerce market at this time is too new and too small to present figures, or even estimates. Trade sources expect M-commerce to take off in 2001, and become successful in the Netherlands during 2002 and following years.

The Netherlands offers an advanced and well-developed infrastructure for digital mobile data communications and M-commerce services. The Netherlands has five mobile services operators. Mobile telephony based on the Global System for Mobile Communications (GSM) standard is widely accepted. The Netherlands has a high penetration of mobile phones and an estimated 9 million users. Operators have recently started to offer General Packet Radio Service (GPRS) services. The Dutch government during the summer of 2000 auctioned five Universal Mobile Telecommunications System (UMTS) licenses. UMTS services for third generation mobile communications will be available within the next three or four years.

The Dutch government is committed to developing an environment that is conducive to M-commerce and is investing in further Information and Communication Technology (ICT) advancements and the digital infrastructure. Development of M-Commerce is considered important for the Netherlands to maintain its competitive position in world markets.

As the technologies develop and become more readily available, business and consumers are gradually beginning to show greater interest in using the new technologies. Short Message Service (SMS) is very popular among the younger generation. Wireless Application Protocol (WAP) initially had a slow start, but the number of WAP sites and WAP service providers is now increasing and services are becoming more popular.

### **18.2 Market Overview and Opportunities**

About the size of the State of Maryland, the Netherlands has a total population of almost 16 million people. There is an active working population of 6.6 million people and there are some 90,000 registered companies with a staff of more than five people. There are 6.5 million Dutch households. The Dutch economy is among the strongest in Europe, and continues to show sustained, albeit slowing GDP growth combined with low unemployment. The Dutch Central Planning Office (CPB) recently released 3% growth forecasts for the economy in 2001 and 2.75% in 2002.

With a healthy and growing economy, trade sources indicate the Netherlands market for Information and Communication Technology (ICT) in total amounted to approximately \$ 23 billion in 2000. The IT market amounted to \$10.8 billion and includes hardware (54 %), software (17 %), computer services (25%) and supplies (4%). The liberalized total Netherlands telecommunications market amounted to approximately \$ 12.3 billion in 2000: 80 % of the market consisted of telecommunications services, while the remaining 20 % can be attributed to telecommunications equipment. According to the 2001 IDC/World Times Information Society Index (ISI), the Netherlands ranks tenth on the list of information economies in the world, and second, behind Taiwan, when the information infrastructure is considered.

IDC forecasts indicate that the Netherlands market for M-Commerce, currently in its infancy, will reach about \$2 billion by 2004 primarily from online trade in the business segment.

There are five mobile telephone operators offering services in the Netherlands. These companies are KPN Mobile, part of KPN Telecom the former Dutch, state-owned PTT with a market share of about 50% in 2000, Libertel-Vodafone with about 30%, and three relative newcomers Telfort, Dutchtone and BEN. Use of mobile telephone equipment and mobile telephone services grew rapidly in the past few years, particularly since pre-paid cards were introduced in the market. On January 1, 1999, there were some 3.5 million Dutch mobile phone users. Today, there are estimated 9 million mobile phone users. The GSM prepaid market has meanwhile overtaken the GSM subscription market.

The Dutch government stimulates the use of new technologies, which strengthen the competitive position of the Netherlands in the new ICT-driven economy. One such initiative is the GigaPort project that was started by the Dutch Ministries of Economics, Transport and Education. GigaPort offers a state-of-the-art-testing platform and infrastructure for innovative and advanced new Internet applications. Among others, GigaPort offers GPRS in cooperation with Libertel and Ericsson.

The use of SMS to send and receive short messages by mobile phone is particularly popular among the younger generation. There are currently estimated 2.5 or 3 million regular users of SMS services. Telfort, owned by British Telecom, recently started offering corporate SMS services. Anglo-Dutch IT services firm and supplier of SMS systems to telephone companies CMG expects a 400% increase in messages sent during 2001.

WAP services were first offered in the Netherlands at the end of 1999. The total number of WAP service users was estimated at about 360,000 at the end of 2000. As the number of WAP sites increases, the number of users is growing. By 2004, 90 percent of mobile phones in use are expected to be WAP enabled.

KPN Telecom introduced M-Info ([www.m-info.nl](http://www.m-info.nl)) at the end of 1999. M-Info was the first portal for information services via WAP in the Netherlands. With a GPRS mobile phone using WAP browser software, the user can get to information on the Internet anywhere, anytime. Information services included in M-Info are: personal information (addresses, calendar, e-mail), news, travel, financial, membership information, miscellaneous services, trade, leisure, and international. The WAP-site, which appears on the mobile phone via GSM net or GPRS net, provides a menu to access the various services with a listing of the cost of using these services on-line. At this time there is an option for business users with a corporate Office Online contract to use this service for mobile access to applications on corporate Intranets. IBM and Interpolis were the first to use this service as part of a pilot project.

KPN Mobile, TIM (Italy) and NTT DoCoMo (Japan) recently signed a Memorandum of Understanding regarding the development of new mobile Internet services for the European market. The services will include: games, e-mail, mobile transactions, and information, e.g. traffic information and location-based services.

KPN recently began offering Unified Messaging (UM) services with voicemail in E-mail, faxmail in E-mail and E-mail in voicemail. Xoip and Message4Y also offer these services in the Netherlands.

As opposed to M-Info, which charges a certain amount for certain types of information, WAPsite [mmm.allwap.com](http://mmm.allwap.com) charges a per-minute rate for WAP service on top of the telephone charges. Other WAP portals in the Netherlands include "Tutch", [www.tutch.nl](http://www.tutch.nl), and "Genie", [www.genie.nl](http://www.genie.nl). German IT firm Materna, which has offices in the Netherlands, is a major

provider of SMS management services and supplier of SMS hardware and software infrastructure to the Dutch GSM providers.

GPRS offers packet-switched connections with faster data speeds, comparable to ISDN, for WAP and other forms of mobile data communications. GPRS Services were first introduced in the Netherlands in December 2000. The introduction of General Packet Radio Service (GPRS) is specifically suited for data transmission, and as such a valuable addition to GSM, which is primarily for voice transmission. GPRS offers the opportunity to stay online and receive location-based services. GPRS and mobile data in general are mostly used in the business market. KPN Telecom is investing about \$110 million on the development of GPRS.

**Among the first in Europe, the Dutch government auctioned five new licenses for use of the IMT-2000/UMTS frequencies in the summer of 2000 for \$ 2.6 billion. The new UMTS frequencies will be used for third generation telephony (3G) within the next three or four years. Each of the current five mobile telecom operators obtained one of the licenses. The UMTS licenses will allow service providers to introduce many new value-added services based on high-speed data and video communications via phone, streaming audio and video in color and stereo. There is some concern that delays will occur in the rollout of the UMTS networks and that not enough third generation services will be available in time to make UMTS interesting to the general public. Once available, location-based services via mobile phone are expected to attract great interest and stimulate the development of further new services. IDC expects that by 2004, there will be 1.2 million UMTS users out of 14 million mobile phone users.**

Mobile Internet applications and information services that are expected to attract the most interest initially are: checking e-mail, calendars, addresses, traffic conditions, weather, sports and financial information. Games are expected to be popular particularly among the younger generation. Of location-based services, when offered on a larger scale, mobile Yellow Pages and Mobile Coupons via SMS or WAP are expected to become popular. Stock exchange transactions via WAP were made available in April 2000 by Dutch Postbank in cooperation with Libertel and Ericsson.

Some obstacles to the growth of mobile Internet use and M-commerce include the fact that services are still considered expensive and slow with complicated interfaces, users often need to upgrade their equipment to use the services, the security of mobile services and networks is not considered optimal at this time and finally, the number of M-services is still limited.

#### 18.2.1 Legal Framework

Following European directives, the Dutch government is in the process of implementing laws and regulations concerning E-commerce, Internet and the use of computers. A new law regarding the protection of personal data aims at providing Dutch citizens more insight in the way their personal data are being used and at protecting their privacy. The law will go into effect in 2001. The law complies with the European Data Protection Directive of October 1995 and replaces the data protection act of 1989. Another new law concerns the protection of consumers who buy from a distance via the Internet, phone, fax and mail. This law went into effect in February 2001. Additionally, there are proposals regarding electronic signatures and liability of Trusted Third Parties, who assign a unique code to a person and record this in a digital certificate. The proposal for a new law on computer crime prevention is under consideration. Privacy of E-mail will be incorporated in the constitution under privacy of letters.

### **18.3 M-commerce technologies**

At this time, most mobile phone users have a GSM phone that can be used for voice and SMS services. Within the next two to three years, the majority of mobile phone users will have a WAP-enabled phone. Available models include WAP phones by Ericsson, Motorola, Nokia, Samsung, Siemens and Sony. The possibilities offered by WAP technology are not yet widely known. WAP-telephony is currently mostly used for news and traffic information, as well as for making online reservations for events.

Personal Digital Assistants (PDAs) and other handheld devices are mostly used in the business community.

At this time, there is no standard operating system for the handheld devices. PalmOS (e.g. Palm) and Epoc (e.g. Psion) and Microsoft Windows CE (e.g. Compaq, Casio) are all popular. Network Associates, the large U.S. supplier of security products with offices in the Netherlands, now offers PGP wireless for PalmOS, Windows CE and Epoc

### **18.4 Competitive analysis**

#### **18.4.1 Market accessibility and marketing strategies.**

The Netherlands offers an open market, which is accessible and welcomes new investments, both foreign and domestic, and in which American products are highly regarded and well accepted. A modern nation, the Netherlands is strategically located in Europe, bordered by the important hinterland Germany to the East, across the North Sea from the United Kingdom to the West, and Belgium to the South. The Netherlands is a founding member of the European Union, and, although small in size, the country plays an important role in the community at various political and governmental levels. The language spoken in the Netherlands is Dutch. English is widely spoken and about 77 % of the population speaks English.

The Netherlands is a technologically advanced country offering an excellent transportation and telecommunications infrastructure. In general, there are few known impediments to the international trade in computer and network products and services that would prevent U.S. companies from successfully doing business in the Netherlands. The Netherlands counts more than 1,600 U.S. companies that are established and doing business in the Netherlands, many of them high technology firms.

Most M-commerce products and services are advertised in the traditional media, primarily trade magazines. With the growing use of the Internet to gather and compare information and to order products and services, an important tool in product marketing is a website. Use of the Dutch language prevails. Distributor or reseller networks are used in the marketing and sales of the products and services. Sales leads are also generated through listing of services in trade directories, direct mail, telemarketing, participation in trade fairs, and through word of mouth. Direct mail and advertising are among the more popular promotional vehicles in the Dutch IT world.

In planning to establish a presence in the Dutch market, the Department of Commerce U.S. Export Assistance Centers can assist with market research studies, trade missions, trade contact lists, International Partner Searches, and setting up overseas appointments through the Gold-Key



Matching Service. The U.S. Export Assistance Centers are located in almost all major cities throughout the United States ([www.usatrade.gov](http://www.usatrade.gov).) Information regarding the actual establishment and location of a subsidiary office in the Netherlands may be obtained from the Dutch Ministry of Economic Affairs/Netherlands Foreign Investment Agency - [www.nfia.com](http://www.nfia.com).

Banking facilities for international transactions in the Netherlands generally meet or exceed U.S. standards. All banks are accustomed to various international-banking transactions. More information about banking in the Netherlands can be obtained by contacting The Netherlands Bankers' Association (NVB) in Amsterdam, [www.nvb.nl](http://www.nvb.nl). Payments in the Netherlands are usually agreed on a net 30-day basis. Dutch companies on average pay two to three weeks after the agreed upon term.

VIRA, the Dutch association of some 40 attorneys representing major law firms throughout the Netherlands and specializing in all aspects of informatics law, was established in February of 1995. A listing of VIRA members is available via [www.vira.nl](http://www.vira.nl).

#### 18.4.2 Import Climate

As a member of the European Union (EU), the Netherlands applies the EU common external tariff to goods imported from non-EU countries. No tariffs or import duties are levied on computer software products entering the EU countries from the United States. An import duty of 0-3.5 % is levied on most computer hardware products. A Value Added Tax (VAT) of 19% is assessed on computer hardware and software products based on their Cost, Insurance, Freight (C.I.F.) value plus the import duty at the port of entry. Information about tariffs and duties can be obtained from the Dutch Customs: Belasting Douane, telephone: 011-31-45-5743031, [www.belastingdienst.nl](http://www.belastingdienst.nl). EU regulations regarding encryption apply in the Netherlands and encryption products can be freely imported and used.

#### 18.4.3 Key Players and prospects

As the market is just starting to develop and M-commerce really does not yet play a role of any significance at this time, it is difficult to discuss the position of domestic, U.S. and third country market suppliers in much detail. The foregoing describes the Dutch market in its early development stages and the parties currently involved. Several large U.S. companies in the Netherlands, including infrastructure providers e.g. Cisco and Lucent, a world leader in mobile Internet Technology, and U.S. companies that already play a role in the E-commerce and online trading markets, will undoubtedly also be prominent in the M-commerce arena. Best prospect opportunities for increased U.S. sales in the developing mobile Internet and M-commerce markets for the coming years include: mobile digital communication infrastructure equipment and terminal equipment and all types of mobile Internet services, M-commerce markets and content providers

### 18.5 Statistical information

Mobile phone use:

1998 - 3.5 million users

1999 - 6.8 million users

2000 - 9 million users

Internet use:

1998 -1.6 million users

2000 - 3 million users

2002 - 7.5 million users

E-commerce (value in U.S. Dollars)

1998 -310 million

1999 -1.1 billion

2000 -2.6 billion

2002 -10.5 billion

Total E-Commerce market in 2000: \$ 2.6 billion

Professional purchases – B2B: 70 %

Consumer purchases – B2C: 30%

At about 60% the Internet connectivity rate in the Netherlands is among the highest in Europe and growing.

More than 100 Internet Service Providers (ISP's) are active in the Dutch market. Free Internet Service Providers serve approximately 40% of Dutch Internet users.

Most popular (consumer) products in E-commerce: books, music CD's, software, travel.

## **18.6 Contact information**

### **18.6.1 U.S. Embassy Contacts**

American Embassy

U.S. Commercial Service

Lange Voorhout 102

1014 EJ Den Haag, the Netherlands

Contact: Mr. Terry J. Sorgi, Commercial Attaché

Phone: +31-70-310 9417, ext. 418

Fax: +31-70-363 2985

E-mail: [terry.sorgi@mail.doc.gov](mailto:terry.sorgi@mail.doc.gov)

Internet: [www.usatrade.gov](http://www.usatrade.gov)

American Consulate General

U.S. Commercial Service

Museumplein 19

1071 DJ Amsterdam, the Netherlands

Contact: Ms. Carlanda L. Hassoldt, Commercial Specialist

Phone: +31-20-575 5351, ext. 349

Fax: +31-20-575 5350

E-mail: [carlanda.hassoldt@mail.doc.gov](mailto:carlanda.hassoldt@mail.doc.gov)

Internet: [www.usatrade.gov](http://www.usatrade.gov)

### **18.6.2 Tradeshows:**

The Internetworking Event 2001

[www.tine.nl](http://www.tine.nl)

RAI Exhibition Center, Amsterdam, The Netherlands

April 18-20, 2001  
April 15-18, 2002  
Annual professional tradeshow for computer networking.

Business Solutions 2001  
[www.rai.nl](http://www.rai.nl)  
RAI Exhibition Center, Amsterdam, The Netherlands  
September 26-28, 2001  
Annual professional tradeshow for ICT solutions, products and services.

Infosecurity 2001  
[www.jaarbeursutrecht.nl](http://www.jaarbeursutrecht.nl)  
Jaarbeurs Utrecht, the Netherlands  
October 19 and 20, 2001  
Annual computer and information security tradeshow.

Internet in Business  
[www.rai.nl](http://www.rai.nl)  
RAI Exhibition Center, Amsterdam, The Netherlands  
November 26-28, 2001

#### 18.6.3 Tradeshow for E-business.

Mobile and Wireless  
[www.rai.nl](http://www.rai.nl)  
RAI Exhibition Center, Amsterdam, The Netherlands  
November 26-28, 2001  
Annual show for wireless computing and mobile communications.

Several international trade shows throughout Europe and in the United States are also well attended by Dutch visitors. These include: CeBIT in Hanover, Germany and Systems in Munich, Germany, and Comdex/Fall, in Las Vegas, NV.

Sources used for this survey include information and forecasts from the European Information Technology Observatory 2000 (EITO '00), IDC, Fenit Marktmonitor 2001, Pro Active and various trade contacts, vendors, trade journals and related independent market research studies about the ICT sector.

Exchange Rate: \$ 1 = DFL. 2.30

## 19 Norway

## 20 Poland

### 20.1 Summary

There are approximately 7 million cellular phone users in Poland. Wireless Application Protocol (WAP) is available on all current cellular networks. Sales of WAP telephones began in February 2000. Industry experts estimate that by December 2000 there were 300,000 users of WAP services. Motorola claims to have a 90% market share of the WAP telephone market in Poland.

Cellular operators announced availability of GPRS platform in August 2000 but the actual implementation is behind schedule.

At the end of 2000, the government cancelled the tender for UMTS licenses. Instead, the three existing cellular operators were each able to purchase a UMTS license as an addition to their GSM and DCS 1800 licenses. Operators will start offering UMTS services no sooner 2002. A tender for a fourth UMTS license is planned for 2002 or 2003.

M-commerce in Poland is at a very early stage of development and it is very difficult to estimate the market for m-commerce solutions. Inadequate infrastructure and high usage cost are seen as the main current barriers to the development of m-commerce in Poland. However, the sector's potential is greatly enhanced by the fact that users are already paying for cellular services and show interest in subscribing to extra services. This is in contrast to users of Internet who in general expect free services.

## **20.2 Market Overview**

At the end of 2000 there were almost 7 million cellular phone users in Poland, which represents a 70% increase over 1999. The cellular penetration rate increased from 10.5% in 1999 to 17.8% in 2000.

The cellular operators are:

- PTK Centertel, the operator of Centertel and Idea networks, with approximately 24% market share;
- Polska Telefonii Cyfrowa (PTC) operating Era GSM network – with 40% market share; - Polkomtel operating Plus GSM network - .over 35% market share.

Industry experts forecast that Poland would become the 6 largest market for cellular services in Europe in 2001.

## **20.3 M-Commerce Technologies**

Wireless Application Protocol (WAP) services became available in Poland in February 2000, first offered by Polkomtel in their Plus GSM network that also offers HSCSD (High Speed Circuit Switch Data). WAP is now available on all GSM networks. Centertel alone estimates that there are 500,000 WAP telephones used by their clients, and 80% take advantage of WAP services. In 2001, 90% of new cellular phone sales are expected to include WAP capabilities.

Most Polish portals currently offer services in WAP protocol and there are many other services available for home, travel and work needs. Operators offer for example weather services, financial data, currency exchange rates, stock exchange information and customs office information to name just a few. Cellular operators claim that WAP has been gaining popularity very fast, becoming the second most popular service after SMS (Short Message Service). The first independent service integrating Internet with GSM, ([www.wapster.pl](http://www.wapster.pl)) has 50,000 registered users. SMS has been playing a key role in the development of WAP. Use of WAP increased by 20% when operators decided to lower access cost.

All cellular operators offer their subscribers SMS information services. Era GSM subscribers with a special card can take advantage of free account information for their Citibank accounts using SMS.

Era GSM was the first network in Poland testing GPRS (Global Packet Radio Service) starting in September 2000 using Motorola and Cisco technologies. In December 2000, Polkomtel (Plus GSM) began offering GPRS in eight major Polish cities (Gdansk, Katowice, Krakow, Lodz, Poznan, Szczecin, Warsaw and Wroclaw). GRPS services in Centertel's Idea network are currently available on a trial basis in Warsaw, Gdansk and Bydgoszcz. Both Polkomtel and Centertel bought GPRS infrastructure from Netia.

Due to limited availability and high cost of terminals as well as the high cost of the service itself, GPRS service is addressed mainly to corporate clients.

Problems with introducing GPRS commercially are the result of a limited supply of telephones, compatibility of telephones and infrastructure from various suppliers and problems with billing. Nevertheless, it is foreseen that by the end of 2001, GPRS will account for 15% of cellular services.

While Poland is expected to implement electronic signature regulations as of January 1, 2002, banking and financial institutions have already developed Internet services, including wireless options. For example, MBank, the Internet arm of the Export Development Bank, already offers their clients contacts through SMS.

As a result of the development trends of m-commerce, Polish companies are starting to look at offering new services. For example, there is an on-going pilot project that would allow the use of cellular phones for parking payment in Warsaw.

## **20.4 Contact Information**

Polska Telefonía Komorkowa CENTERTEL  
Ul. Skierniewicka 10a  
01-230 Warsaw  
tel. 48-22-6561444, 6561486  
fax 48-22-6561570  
[www.centertel.pl](http://www.centertel.pl)

POLKOMTEL  
(Plus GSM network)  
Al. Jerozolimskie 81  
Warsaw  
tel. 48-22-6071000  
fax 48-22-6950484  
[www.plusgsm.pl](http://www.plusgsm.pl)

POLSKA TELEFONIA CYFROWA  
(ERA GSM network)  
Al. Jerozolimskie 181, Ochota Office Park  
02-222 Warsaw  
tel. 48-22-5736000  
fax 48-22-5736914, 5736109  
[www.eragsm.com.pl](http://www.eragsm.com.pl)

## **21 Portugal**

### **21.1 Summary**

By the end of 2001 the telecommunication sector in Portugal should increase by 3% compared to last year. This represents 12% of the GNP and a total amount of USD 13,2 millions. This fact is mainly due to the expected investments done since the beginning of last year by the four licensed operators for the UMTS - Universal Mobile Telecommunications System.

After a highly competitive bid, the winners, Telecel, TMN, Oniway and Optimus, will assure 80 percent coverage of the national territory by the end of the first year and almost 100 percent after the fifth year of the 15 years license. The base used by the Government to attribute these licenses was not a public auction, as in other European countries, but political criteria such as the contribution that each of the projects have given to the creation of an "Information Society". The "Information Society" is defined as the intention of the Government to modify/transform Portugal into a more technically developed society in terms of infrastructure, usage capability and attitude towards the information era.

UMTS's digital technology and the need of a larger number of antennas, when compared with the GSM technology, leads to such high investments that the selected operators are presently trying to reach to an agreement in order to create a shared company to build infrastructures and minimize the fixed costs.

Portuguese total population penetration rates of fixed and mobile phones, 43 percent and 52 percent respectively, appears to be a good development indicator, nevertheless, the internet access presents one of the lowest rates among EU countries: only 6 percent of the total population. The personal computer penetration rounds a total of 20 percent.

With the starting of UMTS, the third generation net, a boom in the traffic of data will happen in a short term. An increase in the weight of mobile phones is expected to increase from the actual 2 percent to 50 percent up to 2004. It is also estimated that the m-commerce across Europe will contribute to the data traffic being estimated to grow from USD 290 million in 1998 to USD 21.4 billion in 2003, an average annual growth rate of 236 percent. The same trend will necessarily happen with Portugal.

Recent studies indicate the m banking and the m advertising as the main contributors to the m-commerce, reaching 4,9 and 5,5 million dollars respectively. Buying through mobile phones, including retail, ticketing, reservations and auctions will reach USD 3.5 million. These three applications will be the main motors of m-commerce growth with 60 percent of the e-commerce revenues generated in 2003.

## 22 Romania

## 23 Russia

## 24 Slovak Republic

## 25 Slovenia

### 25.1 Summary

GSM mobile telephony in Slovenia began in 1996. Slovenia had only one operator at the time. Its services were relatively bad and expensive. Penetration was very low. The new telecom law enforced in June 1997, was the first step in the deregulation of the telecom sector. In summer 1998, Slovenia licensed a second GSM operator Si.Mobil and its first GSM service provider Debitel. The GOS announced three 1800 MHz licenses in November 2000. A concession to a new operator always brought a considerable price reduction and service improvement. GSM telephony was a real boom in 1999 and 2000. It grew for 210% each year. As of February 1, 2001, the penetration rate of mobile telephony is 63%.

The GOS has prepared a new bill on telecommunications, which will probably be adopted by May 2001. The new bill is expected to be fully compatible with the EU legislation and include all EU directives. It envisages an independent Telecommunications Agency, which is now a part of the Ministry for Information Society. Government of Slovenia intends to announce a public tender for up to three UMTS licenses in March 2001.

In the year 2000, both operators were mainly busy with activities to increase their customer base. Although they mainly competed with prices and less with content, new applications were introduced in the market. The following products are currently available on the market:

- SMS: short message system was a real hit in the past 18 months. Its use still grows with the same pace since its introduction, mainly due to permanent price decreases.
- Email: the use of email is not very common because awareness of the feature is low, especially among prepaid users.

- Financial information: all major banks offer limited financial information. Financial applications are the fastest growing product line.
- Travel information: two cities in Slovenia have already built information system for travelers.
- Advertising, music, and theater listings and similar: the first and the largest operator started with applications in summer 2000. The second operator plans to begin with similar content in 2001.
- Transactions: first financial applications (mobile banking) will soon be offered when trial period will be positively assessed. First business applications are finished (information newspaper; Internet retail shop adapted for WAP)

## **25.2 Market trends and obstacles**

The market growth for M-Commerce has not been following the rapid growth of mobile telephony. There are several reasons. Operators were very busy with infrastructure construction and basic telephony packages. Competition was introduced late and it is still very weak. Such situation does not force the No. 1 operator with 90% market share to be very aggressive with new contents. On the other hand, a few local firms proved a very high qualification for development of applications. The leading operator has announced that more applications will be on the market soon, most likely in summer 2001 in order to keep advantage with new contents before the third operator starts marketing its products.

The main focus of applications is information and not transaction. Competition among operators is the main market driver. There are indications that banks will aggressively enter the market. First projects showed that only general content has the future. Other projects can not succeed because of a small market, which does not justify high development costs. Transaction applications are handicapped with security issue.

The current situation in Slovenia shows that operators do not push M-commerce. Before they start with aggressive marketing, they have to solve the open question of how to charge new contents. Software solutions are on their way.

It seems that major vendors (telco service providers/operators and financial institutions) have no need for implementation of broader applications. All players mainly just declare that they have a strong intention to implement the necessary services. Increased competition in the fall of 2001 (the third operator Western Wireless will start marketing its services) will very likely bring new developments in the sector.

The major obstacles for the market are security question and low stability of WAP applications.

## **25.3 M-commerce technologies**

In Slovenia the latest technology products from handsets to wireless links with other personal devices are available. Ericsson very well supports the largest operator Mobitel, while the second operator SiMobil relies on Siemens equipment and know how. Mobitel signed an agreement with Ericsson that Slovenia would be its testing partner for UMTS technology. According to GSM specifications, Slovenia's current implementation is phase 2+ with WAP and SMS implemented and HSCSD, GPRS in trial runs. Because of Mobitel's agreement for testing UMTS, it is likely that Slovenia will be among first countries to introduce phase 3.



Operating systems are mainly Microsoft NT or Linux. The most popular browser is Microsoft Explorer. Security solutions are mainly based on Entrust products.

The coming third operator Western Wireless International will rely on American technology.

## **25.4 Competition and Market Accessibility**

The market is very liberal. Prices and national coverage were the main competitive factors in the past. The situation will change very soon. The key competitive factor in the future will be what content will be available at individual service providers. Predominantly clumsy marketing approach of the first two providers will be challenged with fresh, aggressive, American marketing strategies.

Prospects of American companies for M-commerce are great. There are no import restrictions in Slovenia regarding telecommunications products. Domestic market players usually have knowledge to develop new applications, but they lack financial means. Also, the Slovenian market is too small to justify applications developed only for Slovenia. It means that domestic developers of content applications can not compete with foreign vendors, if they will not approach broader market.

## **25.5 Contacts**

### **25.5.1 Legislation and licenses**

Ministry of Information Society  
Langusova 4  
1000 Ljubljana  
Slovenia  
Tel + 386 1 478 8223; fax + 386 1 478 8142  
Dr. Pavel Gantar, Minister  
[www.gov.si](http://www.gov.si), [mid@gov.si](mailto:mid@gov.si)

Telecommunications Administration  
Kotnikova 19A  
1000 Ljubljana  
Slovenia  
Tel + 386 1 473 4901  
[www.gov.si](http://www.gov.si)

### **25.5.2 Security Solutions Key-players**

HERMES PLUS Group – ICOS  
Slandrova 2,  
1000 Ljubljana  
Slovenia  
Tel + 386 1 5895 256, fax + 386 1 5895 259  
[www.hermes-plus.si](http://www.hermes-plus.si)

HERMES PLUS Group – Macek Communications

Kersnikova 19  
3000 Celje  
Slovenija  
Tel + 386 3 428 4000, fax + 386 3 428 4010  
[www.hermes-plus.si](http://www.hermes-plus.si)

Inetis  
Mariborska 86  
3000 Celje  
Slovenia  
Tel + 386 3 426 0000  
[www.inetis.si](http://www.inetis.si)

Hermes SoftLab  
Litijska 51  
1000 Ljubljana  
Slovenia  
Tel. + 386 1 586 5200  
[www.hsl-ic.si](http://www.hsl-ic.si)

## 26 Spain

## 27 Sweden

### 27.1 Summary

Sweden has maintained its position as the economy most in tune with information technology in all aspects reports IDC in its IDC/World Times Information Society Index (ISI). For the second year in a row, the ISI ranked Sweden as No.1 in the ability to access and absorb information and information technology. As much as 7.72 percent of Sweden's GDP is invested in telecommunications and information technology.

There are three mobile service providers, Telia, Tele2 and Europolitan. Mobile phone penetration is around 60 percent, and over 70 percent of Swedish households have a PC. Internet usage is very high with around 66.9 percent of all Swedes aged 12-79 using or having access to the Internet. The Swedish regulator PTS issued four 3G licenses in December to Tele2, Europolitan, HI3G, and Orange. Tele2 will collaborate with Telia, which surprisingly enough did not get a license on building infrastructure as will Europolitan and HI3G, and Orange.

During, 2000 500 million SMSs were sent compared to 140 million in 1999. As in other countries, those who use SMS are primarily younger subscribers and the heaviest users are people in the age bracket 20-29 (263,000), followed by people 15-19 (175,000), 30-39 (112,000), 40-49 (51,000), 50-59 (18,000), and 60-up (4,000). The numbers in brackets show individuals that send one SMS at least per day.

M-commerce is at an early stage of development and adoption and there is a big gap between what the technology can do currently and what the consumers believe can be offered according to report from the Boston Consulting Group. The Wireless Application Protocol (WAP) has not lived up to its high expectations due to its non-user friendliness and fees are still too high according to consumers. The most common ways of using the phones, except voice telephony,

are email, SMS and news information. E-banking, both for private and corporate customers, is already highly developed in Sweden and all major banks offer m banking via WAP enabled phones. At yearend 2000 there were 2.7 million Internet banking customers in Sweden. Services currently offered on the Swedish market include banking, health care, positioning, and entertainment applications.

A large number of initiatives are under way to introduce broadband Internet access to households and corporate customers throughout Sweden. The Swedish government, through its IT Bill recently presented to the Swedish Parliament, plans to invest around USD 976 million on broadband expansion throughout Sweden with the condition that commercial players match the investment. The investments will run over a four-year period. Around 40 percent of the population will have broadband access by 2005.

M-commerce is expected to improve considerably with the introduction of Bluetooth, EDGE and GPRS. However, rollout of these new technologies has been delayed as production of instruments for these applications are lagging behind infrastructure expansion. The real driver for the market will be the arrival of UMTS (3G) in 2002. One major trend, and according to some, a major threat to 3G, is the emergence of hotspots in a variety of places, one of which is Telia's HomeRun, a service offered in collaboration with Symbol Technologies.

Sweden has been a member of the European Union since 1995 and has implemented the following Directives: the Data Privacy Directive, the E-commerce Directive, the E-signature Directive and the Distance Contract Directive.

PDAs have become very popular in Sweden over the last few years and it is estimated that in 2001, 400,000 units will be sold. The number of WAP terminals is increasing on the market and in 2001 it is forecast that one million units will be sold. Motorola is the only supplier of GPRS phones currently. Other suppliers are not expected to deliver phones until the end of this year. Europolitan is the only operator that has launched GPRS services. Telia has announced that the company will launch its services some time in the fall, and other operators are expected to follow suit.

Sweden has implemented the EU Directive on E-signatures by introducing a new law effective as of January 1, 2001. Procurement of electronic ID documents will commence this summer.

Sweden is an open and deregulated market with a positive attitude toward U.S. technology. There are over 200 companies in Sweden specializing in wireless communications and mobile Internet.

## **27.2 Market Overview**

As much as 7.72 percent of Sweden's GDP is invested in telecommunications and information technology and according to the OECD, Sweden invests a larger part of its GDP in "knowledge" education, training and R&D than any other country in the world. As a result the country has become one of the most wired countries in the world with an advanced domestic market consisting of well-informed buyers.

Sweden has maintained its position as the economy most in tune with information technology in all aspects reports IDC in its IDC/World Times Information Society Index (ISI). For the second year in a row, the ISI ranked Sweden as No.1 in the ability to access and absorb information and information technology. According to the Invest in Sweden Agency, it is the Sweden's continual

investment in wireless and Internet technologies and IT infrastructure that has produced this unique business climate. The ISI rating is based on four infrastructure categories: computer, information, Internet, and social infrastructure. The index credited Sweden with the highest Internet infrastructure scores, together with Singapore and Australia.

There are 158 companies in Sweden that supply telecom services in one form or another. Thirteen companies have fixed services licenses and there are three mobile service providers, Telia, Tele2 and Europolitan. Mobile phone penetration is around 60 percent, and over 70 percent of Swedish households have a PC. Internet usage is very high with around 66.9 percent of all Swedes aged 12-79 using or having access to the Internet.

Sweden has a well-developed mobile telephone market with 5.7 million subscribers reported at the end of June 2000. The market increased by 621,000 subscribers, which represents an increase of 12 percent. This increase should be considered extremely good in view of the already high penetration of mobile phones in Sweden (around 60 percent). By September 30, the number of subscribers had reached 6 million. As much as 72 percent of Swedish subscribers are private customers and around 40 percent of those customers use prepaid cards while revenue from this segment is only 10 percent. The Swedish regulator PTS issued four 3G licenses in December, 2000 to Tele2, Europolitan, HI3G, and Orange. Tele2 will collaborate with Telia, which surprisingly enough did not get a license, on building infrastructure, and Europolitan and HI3G have joined forces.

The SMS segment is increasing and is becoming more important to the operators than anticipated. During 2000, 500 million SMSs were sent compared to 140 million in 1999. During the latter part of 2000 the price for sending a message decreased from 26 cents to 16 cents much thanks to a new entrant on the Swedish market, Norwegian Sense. The Swedish regulator, PTS, still considers the price too high and will most likely make sure that it is lowered, no doubt resulting in increased use of the service. As in other countries, those who use SMS are primarily younger subscribers and the heaviest users are people in the age bracket 20-29 (263,000), followed by people 15-19 (175,000), 30-39 (112,000), 40-49 (51,000), 50-59 (18,000), and 60-up (4,000). The numbers in brackets show individuals that send one SMS at least per day.

It is estimated that in 1999 around 18 percent of Swedish Internet users shopped online. In 1999, 0.7 percent of all retail sales took place on-line, placing Sweden in second place worldwide behind the U.S. Sweden lags behind the U.S. by around 6 months, compared to an overall European lag of 1.5 to 2 years. During 2000 it was forecast that sales will have almost doubled in value and in 2005 it is estimated that on-line shoppers will make purchases for USD 256 million.

Mobile Internet has come into focus very much during the past year. There are a number of drivers behind this, among others the increasing Internet maturity and emerging new technologies. However, m-commerce is at an early stage of development and adoption and there is a big gap between what the technology can do currently and what the consumers believe can be offered according to report from the Boston Consulting Group. The Wireless Application Protocol (WAP) has not lived up to its high expectations due to its non-user friendliness and fees are still too high according to consumers. The most common ways of using the phones, except voice telephony, are email, SMS and news information. E banking, both for private and corporate customers, is already highly developed in Sweden and all major banks offer m banking via WAP enabled phones. At yearend 2000 there were 2.7 million Internet banking customers in Sweden.

According to Invention, a research company, in five years 42 percent of the Swedish population will be using wireless Internet. Services currently offered on the Swedish market include banking, health care, positioning, and entertainment applications. Ericsson, in collaboration with ICA, the leading Nordic retailing group with 4,600 stores, is conducting the world's first trials with Bluetooth wireless technology in retail stores. Using mobile phones with WAP and Bluetooth technologies, customers have been able to pay for goods, check their accounts and find out about current offerings. Another project has been launched by Mint, a Stockholm-based company. On a trial basis, the company has installed terminals in a number of shops in one area in Stockholm and customers pay via their phones on a pre-paid basis. Other similar players on the market are German Paybox and Swedish Gismo.

The following sectors are expected to be the leading areas within m-commerce according to the Boston Consulting Group: banking, travel services, entertainment, books, and CDs.

A large number of initiatives are under way to introduce broadband Internet access to households and corporate customers throughout Sweden. The Swedish government, through its IT Bill recently presented to the Swedish Parliament, plans to invest around USD 976 million on broadband expansion throughout Sweden with the condition that commercial players match the investment. The investments will run over a four-year period. Around 40 percent of the population will have broadband access by 2005.

M-commerce is expected to improve considerably with the introduction of Bluetooth, EDGE and GPRS. However, rollout of these new technologies has been delayed as production of instruments for these applications are lagging behind infrastructure expansion. Mobile users consider the current initial costs and operation fees too high and this, together with flawed technology, may account for the slow adoption of new applications. The real driver for the market will be the arrival of UMTS (3G) in 2002. One major trend, and according to some, a major threat to 3G, is the emergence of hotspots in a variety of places, one of which is Telia's HomeRun, a service offered in collaboration with Symbol Technologies. HomeRun is installed in around 100 hotspots in airports (all SAS international lounges), train stations, hotels, and conference centers. Telia estimates that another 300 sites will have been added to the list at the end of 2001.

Ericsson is, of course, the key player on the Swedish market along with partners in various projects, the latest of which is an alliance with IBM. The two companies have announced that they will work together to help financial services companies deliver Mobile Internet offerings. The alliance will combine the wireless telecommunications expertise of Ericsson with the financial services and information technology expertise of IBM. Among other Swedish players are Ehand (personal wireless services), PicoFun and Bluefactory (entertainment). A list of some other players in the market is provided below.

Sweden has been a member of the European Union since 1995 and has implemented the following Directives: the Data Privacy Directive, the E-commerce Directive, the E-signature Directive and the Distance Contract Directive.

### **27.3 M-Commerce technologies**

PDAs have become very popular in Sweden over the last few years. In 1998, 69,100 units were sold, in 1999 155,170 (an increase of 125 percent), during 2000 it is forecast that 260,000 were sold. IT Research is estimating that in 2001, 400,000 units will be sold. The dominating

manufacturer is Palm OS with two thirds of the market. The company is competing with Epoc, Pocket PC and Visor.

The number of WAP terminals is increasing on the market. In 1999 2,500 units were sold in Sweden, in 2000 it is estimated that 500,000 units were sold and in 2001 it is forecast that on million units will be sold. Nokia is the largest supplier, followed by Ericsson and Siemens. Motorola is the only supplier of GPRS phones currently. Other suppliers are not expected to deliver phones until the end of this year. Europolitan is the only operator that has launched GPRS services. Telia has announced that the company will launch its services some time in the fall, and other operators are expected to follow suit.

There are no specific preferences in terms of operating systems and browsers. All the major companies are represented in the market.

One area of concern is privacy and security. It is believed that the mobile network is less secure for transmitting credit card information than the fixed line Internet. Swedes are reluctant to use credit cards on the Web, they rather pay by invoice or COD. Less than 20 percent of online purchases are paid by credit cards. Despite these concerns the future of m-commerce looks promising as most consumers expect security issues to be solved. Sweden has implemented the EU Directive on E-signatures by introducing a new law effective as of January 1, 2001. Procurement of electronic ID documents will commence this summer and the certificates will be used in PKI solutions for use in communications with government agencies. Telia and Sweden Post are already offering ID solutions and a number of Swedish banks are in the process of creating a system for electronic ID services.

According to the Boston Consulting Group, the following are the top m-commerce brands in Sweden:

Nokia, Ericsson, Telia (operator), Halebop (wireless portal), Aftonbladet (evening tabloid), Europolitan (operator), Yahoo, Letsbuyit (shopping site), DOF; MyDOF (Telia WAP product), FSbanken (bank), Bildet (shopping site), Comviq (operator), and Siemens.

## **Competitive Analysis**

Sweden is an open and deregulated market with a positive attitude toward U.S. technology. There are over 200 companies in Sweden specializing in wireless communications and mobile Internet. The majority of them are active in personal wireless services, but a considerable number are broadband suppliers. The country is considered to be an excellent test bed and several U.S. and third country companies have established development facilities primarily in the Stockholm region, among them are Microsoft, Intel, Hewlett Packard, Motorola, Oracle, IBM, EDS, Nortel, and Siemens. There are a number of partnerships with local companies as well. One example is Halebop, a mobile portal, owned jointly by Oracle and Swedish operator Telia. Halebop, in its turn, works in partnership with Motorola and 24/7 Media. As Sweden is very advanced technologically, it is an excellent, but small, market for U.S. businesses to enter, especially if the opportunity to partner with a Swedish company presents itself. A large number of these new Swedish companies are able to add value to already existing U.S. technology, which also adds new business opportunities for exports to larger markets.

Below are listed a number of Swedish companies specializing in wireless and mobile communications and their web addresses.

## **27.4 Statistical Information**

Please see above

## **27.5 Contact Information**

### **27.5.1 Government**

Ministry of Industry, Employment and Communications  
SE-103 33 Stockholm  
Phone 46/8/405 1000  
Fax 46/8/411 8943  
[www.regeringen.se](http://www.regeringen.se)

The National Post & Telecom Agency (PTS)  
Box 5398  
SE-102 46 Stockholm  
Phone: 678 5500  
Fax 46/8/678 5505  
[www.pts.se](http://www.pts.se)

The Swedish Competition Authority  
SE-103 17 Stockholm  
Phone 46/8/700 1600  
Fax 46/8/24 55 43  
[www.konkurrensverket.se](http://www.konkurrensverket.se)

The Swedish Public Procurement Authority  
Box 22280  
SE-103 17 Stockholm  
Phone 46/8/454 4600  
Fax 46/8/791 8972  
[www.statskontoret.se](http://www.statskontoret.se)

### **27.5.2 Private Sector**

#### *Trade Associations*

IT-företagen (ICT companies)  
Box 5501  
SE-114 85 Stockholm  
Phone 46/8/483 8300  
Fax 46/8/667 0461  
[www.sito.se](http://www.sito.se)

MTB (suppliers of mobile telephone equipment)  
Box 1316  
SE-111 84 Stockholm  
Phone 46/8/24 07 00

Fax 46/8/21 84 96

[www.mtb.se](http://www.mtb.se)

*Major Service Providers*

Telia AB

SE-123 86 Farsta

Phone 46/8/713 1000

Fax 46/8/724 9029

[www.telia.se](http://www.telia.se)

NetCom AB

Box 2094

SE-103 13 Stockholm

Phone 46/8/562 000 60

Fax 46/8/562 000 40

[www.netcom.se](http://www.netcom.se)

Telenordia AB

Arstaangsvagen 11A

SE-117 43 Stockholm

Phone 46/8/ 587 870 00

Fax 46/8/587 870 01

[www.telenordia.se](http://www.telenordia.se)

WorldCom AB

Box 69

SE-164 94 Kista

Phone 46/8/566 115 00

Fax 46/8/566 115 59

[www.worldcom.se](http://www.worldcom.se)

Global One

Box 1

SE-171 18 Solna

Phone 46/8/519 131 00

Fax 46/8/519 132 00

[www.globalone.se](http://www.globalone.se)

RSLCOM

Vretenvagen 2

SE-171 28 Solna

Phone 46/8/445 2600

Fax 46/8/445 2659

[www.rslcom.se](http://www.rslcom.se)

Sonera Sverige

Box 1107

SE-164 22 Kista

Phone 46/8/750 3020

Fax 46/8/750 3029

[www.sonera.se](http://www.sonera.se)



Europolitan AB  
Box 5251  
SE-102 46 Stockholm  
Phone 46/8/678 0950  
Fax 46/8/678 0980  
[www.europolitan.se](http://www.europolitan.se)

### 27.5.3 Swedish wireless communications companies:

Netch Technologies (systems solutions for m-commerce)  
[www.netch.com](http://www.netch.com)

Aspiro (wireless Internet applications)  
[www.aspiro.se](http://www.aspiro.se)

room33.com (wireless portal)  
[www.room33.com](http://www.room33.com)

Halebop (wireless portal)  
[www.halebop.com](http://www.halebop.com)

Goyada (wireless portal)  
[www.goyada.com](http://www.goyada.com)

ZoomOn (graphics software)  
[www.zoomon.se](http://www.zoomon.se)

Mint AB (payment applications)  
[www.mint.nu](http://www.mint.nu)

Linq (portals)  
[www.linq.com](http://www.linq.com)

Melody (mobile Internet applications and enablers)  
[www.melody.se](http://www.melody.se)

Ticket Anywhere (ticketing)  
[www.ticketanywhere.se](http://www.ticketanywhere.se)

Port 42 entertainment applications)  
[www.port42.se](http://www.port42.se)

Wireless Opinion (market and opinion surveys)  
[www.wirelessopinion.com](http://www.wirelessopinion.com)

Blue Ice Research (security)  
[www.blueiceresearch.com](http://www.blueiceresearch.com)

Mobileyes (software for wireless information devices)  
[www.mobileyes.com](http://www.mobileyes.com)

Sources:

The Swedish Post & Telecom Agency  
Federation of Industries  
Ministry of Industry, Employment & Communications  
Invest in Sweden Agency  
The Boston Consulting Group  
Trade and Financial Press  
Infovention  
**Stockholm Chamber of E-commerce**

## 28 Switzerland

### **SUMMARY**

M-commerce has an incredible potential in the Swiss Market, but it is not yet sufficiently developed. M-commerce mainly depends on reasonably priced services that work properly. Offering such services is severely hampered by the limitations of the current generation of handheld mobile devices – i.e. small displays, limited bandwidth, cumbersome navigation and data entry. End-users are also very disappointed by WAP applications and therefore quite reluctant to invest in other new devices that promise full Internet access. However, new technologies are being introduced into the Swiss market and will have a substantial impact on mobile Internet services. Swisscom, the largest GSM operator has launched HSCSD (High Speed Circuit Switched Data) for its business customers. Orange, the 2<sup>nd</sup> largest GSM operator offers HSCSD to all its customers and diAx, the 3<sup>rd</sup> GSM operator chose GPRS (General Packet Radio Service) as a new service that allows data transfer up to 170 kBit/s. Unfortunately, all three operators charge relatively high fees for this higher-speed access – i.e. the download via diAx's GPRS system of a 3-minute MP3 song costs approx. \$ 14.

There are many reasons to be optimistic about m-commerce in Switzerland. At the top of the list is the high mobile phone (approx. 63%) and Internet (approx. 45%) penetration. According to the Economist Intelligence Unit (EIU) 2000, Switzerland is number 10 in the world on the "E-Readiness Scale". Since 1996, Switzerland has been number 1 in per capita investment in Information and Communication Technology (Source EITO 2000). Close to 40% of Swiss companies sell products and services online and a total of 21% of Swiss companies expect increased sales through M-Commerce applications. Over all e-commerce sales have more than doubled from 1999 to 2000 (an increase from \$ 145 million to \$ 300 million).

An additional reason for optimism for further e-commerce growth is the fact that Switzerland is Europe's number 2 (behind Sweden) in Internet usage.

#### *28.1.1.1 MARKET OVERVIEW*

##### **General**

The m-commerce market is still in its infancy. However, several banks have launched mobile access platforms for their customers (using WAP technology) and a number of online retailers are selling their products to mobile users. But the required convergence of different industry

sectors still poses a major challenge. The software, hardware, the service provider and the operators have to work together to create easy to use applications. Higher speed mobile access (such as HSCSD, GPRS or software compression) is making it easier to use Internet based solutions, but the necessary devices are not yet available.

Roughly 50 % of Swiss companies contemplate the implementation of m-commerce solutions, but only 13 % see themselves as being pioneers, rather than late adapters of this additional sales channel. Some applications that are most promising in the near future include: online booking, banking, trading, information services and marketing.

### **Technological aspects**

Since GSM data transfer is limited to approx. 9,6 kBit/s, it is not usable for M-Commerce. However, the GSM network is being used for HSCSD and GPRS applications and new compression software can further enhance this 2<sup>nd</sup> generation mobile system. It is becoming more apparent that investments in the 3<sup>rd</sup> generation wireless standard (UMTS) are at risk. The Swiss UMTS licenses were sold at the low rate of approx. \$ 35 million a piece – this is a definite advantage for the winners of these licenses. The initial data transfer rate of UMTS is expected around 380 kBit/s – even though the maximum rate is 2 kBit/s. The difference to HSCSD or GPRS is therefore already shrinking, while the costs for UMTS services are likely to be quite high. An additional complication for UMTS is the delayed availability of handsets – industry insiders worry that the UMTS devices will not be on the market prior to the 2 year 2003 or even 2004. It is noteworthy that basically all new technology goes through the stage of appearing unprofitable, and at the end of day, only time will tell with UMTS.

### **Mobile Communications**

Approx. 4,5 million users are registered on the Swiss GSM networks of Swisscom, Orange and diAx (GSM 900 MHz and 1800 MHz systems). These companies invested more than \$ 2 billion in their networks (excluding the investments already made in the UMTS build up). The clear market leader is still Swisscom with an estimated 3,1 million users (69 % market share). Orange follows with approx. 800'000 users (17 % market share) and diAx with 600'000 (14 % market share) sold contracts.

### **M-Commerce services leads to new roles for GSM operators**

M-Commerce is tempting the mobile operators to redefine their business and become both service and content providers. The underlying reason is the hope that value-added services will more and more compensate for lower per-minute charges. It also helps the operators to retain their customers through valuable services. In the past, strategies to remain competitive and attract new customers were based on monthly fees, cost-per-minute charges, voice quality and overall geographical coverage. Increased competition has shifted the focus away from the core business to value added services and content. It remains to be seen if this is a successful approach in the long term. Market observers believe that 70 % of all M-Commerce will be Business to Consumer. If this proves to be true, the creation of M-Portals by wireless service providers will be very lucrative.

**Mobile devices are challenging the dominance of PCs.** The ability of mobile devices to connect to the net wherever the user is located is the most powerful argument in favor of mobile

devices. They are also considered to be genuinely “personal,” which is not the case with PCs, which are collectively used in organizations, households or public places. Mobile devices are less expensive than PCs and can easily be carried by their owners. Distribution figures are already higher than the number of stationary Internet connections. Recent forecasts indicate that the penetration of mobile phones may reach 83% of the Western European population – twice as much as the fixed-line Internet world. An important difference between PC distributors and mobile devices distributors is that the latter have increased their business volumes approx. 5 times within the last year.

Mobile devices already offer an infrastructure of secure hardware: GSM mobile phones and newer PDA (Personal Digital Devices) use SIM cards – which are historically used to provide the user a safer environment and to prevent fraudulent use. SIM cards are ideal for the storage of private keys and digital signature files. Newer technologies that can be imbedded in the software of mobile devices are also a promising solution - especially since more than 50 % of the all units are replaced annually (approx. 2,8 million – retail value of approx. \$ 1 billion).

#### E-Commerce developments

The volume of Switzerland’s e-commerce doubled again from 1999 to 2000. The main driver for growth is increased B2B (Business to Business) transactions. The internationally very competitive areas of the Swiss industry (finance, pharmaceutical, chemical, insurance and information technology) have largely embraced the possibilities e-commerce provides. However, the small and medium enterprises (SME’s) have been much slower to adapt. They clearly represent the largest potential to e-commerce solution providers in the Swiss market. Of all Swiss enterprises with 5 or more employees, 39 % use the Internet for sourcing products and services – albeit at a relatively low value level. 86 % of business buyers go directly to the homepage of the seller (sell-side), 20 % use e-marketplaces and only 6 % visit online auction sites.

**Growth in the business-to-consumer field grew by an estimated 100% between 1999 and 2000.** Growth rates of over 800% are expected in online insurances, followed by 200% in online auctions, consumer electronics, food products as well as flowers and gifts. Online brokerage, representing the largest online turnover in the B2C (business to consumer) market is only expected to grow by 50 %, an increase from \$ 40 million in 1999 to \$ 60 million in the year 2000. Other major B2C online markets in 1999 were travel and tourism (\$ 18 million), computers and peripherals (\$ 17 million), food and flowers (\$ 13 million), books (\$ 12,5 million) and CDs/Videos/Tickets (\$ 12,5 million). The payment method most commonly used by consumers is credit cards (45 %) followed by invoice (40 %) and payment on receipt (10 %). Only 2 % of all payments were done by e-cash.

**Optimistic forecasts for m-commerce in the b2c field:** m-commerce is estimated to reach \$ 2 billion in 2004 – 70 % being realized in the B2C market segment. These estimates are based on 3 million mobile Internet users in 2004 in Switzerland. By that time it is anticipated that 80 % of mobile Internet users will use m-commerce applications, spending on average \$ 600 per year.

Whether the optimistic scenario prevails will depend largely on whether the Swiss parliament, government agencies and courts translate rhetoric into e-commerce friendly policies. This in turn will require resolving lingering questions on digital signature, taxation, data privacy, and copyright protection.

#### Internet and Online Services

Switzerland still lags behind the United States in Internet access and e-commerce activities, but the number of web-users is expected to grow from 2.2 million in 1999 to 4.7 million in 2004, a

compounded annual growth rate of 22.7%. A interesting difference between the United States and Switzerland is the mobile phone penetration and high speed Internet access. Based on BCG's 1999 figures, Switzerland is ahead of the US in mobile phone penetration (30 % vs. 26 %) and cable TV penetration (71 % vs. 65 %). This difference could at least make up the hesitant use of the average Swiss user when it comes to ordering and paying over the Internet. Recent figures also indicate that PC penetration has increased in Switzerland from 53 % in 1999 to 67 % in 2000.

The three biggest Swiss Internet service providers (ISPs) are BlueWindows (owned by Swisscom), Swiss Online (owned by Cablecom) and Sunrise/diAx. At the end of 2000, they counted more than 3.1 million subscribers.

About 2,5 million Swiss households are equipped with computers, and experts estimate that in the year 2000, about 40 % percent (3 million) of all households will have Internet access. Switzerland boasts about 150 providers of direct Internet connections. Growing acceptance of this medium can also be evidenced by an increasing market volume of services for interactive computing, TV sets and internet access, which is projected to rise to \$ 0,5 billion in the year 2000, up from \$ 0,3 billion in 1998.

Swiss businesses had invested approx. \$ 0.25 billion in net access by mid-1999 and at the current pace over 60 % of all Swiss companies will soon have Internet sites.

## **COMPETITIVE SITUATION**

Some experts point out that Europe may be two to three years ahead of the United States in the m-commerce field, because of the GSM standard, which provided all players with the same platform – different from the United States, where more than one standard for mobile telephony is being used. Others maintain that the United States, based on its e-commerce experience, where it is about three years ahead of Europe will be able to close this development gap in m-commerce applications, solutions and offers very fast.

It is important to point out that the average Swiss Internet user has only spent \$ 80 during 1999, compared with \$ 400 in the United States.

In comparison with the OECD countries, Swiss mobile users save an average of 20 – 25 % on their monthly and per-minute connection charges (business users save even close to 30 %). Overall Internet access is approx. 15 % cheaper than in the OECD countries.

The rapid acceptance of SMS-messaging services and the accompanying increase in the use of cellular phones in Switzerland, especially among the younger population gives room for optimism for m-commerce in the near future, which may be hampered only by a shortage of Internet-phones and secure transaction venues.

### **28.1.2 Best Prospects**

Easy identification, localization and personalization of information and commercial offers are the strengths of m-commerce systems. These are also reflected in the best prospect areas for m-commerce applications:

Financial services, E-mail/SMS, local news, weather forecasts and sports are presently the areas most in demand. Good potential is also forecast for services whose marketing can be personalized, buying of food and flowers, travel and transportation and construction information and, using the appropriate security measures, financial services and payment of parking and tolls. In this segment, banks expect standardized transactions to increase from 3 to 12 percent. No surprise that Switzerland's two largest banks (United Bank of Switzerland and Credit Suisse) are investing an estimated \$ 600 million in Internet solutions this year alone. Within the financial services area, partnering seems to be easier and happening faster in the m-commerce than it took place in e-commerce. Major players have become more flexible; mobile carriers, and hardware and software companies appear to be best suited to become partners of financial institutes. The majority of all sales will be realized on the Sell-Side (directly with the seller) and over virtual marketplaces.

#### *28.1.2.1 Opportunities for market players*

The following provides a short overview on the various groups that are involved and can benefit from m-commerce:

**End-users:** Mobile professionals, stock investors and analysts, purchasing agents, craftspeople, service technicians, concert-goers, and e-shoppers in general.

**Content providers:** Banks, stock brokerages, ticketing vendors, information services and administrative services all provide services that lend themselves particularly well to m-commerce solutions.

Software providers

Players providing infrastructure:

*Authentication services: Trusted Third Parties* The process of digitally validating identities requires the service of independent agencies that enjoy the trust of the participants. Most of these services are related to the generation, storage and distribution of digital certificates, but there are also other services, such as date/time stamping, archiving, and notary services that will find a waiting market. Trusted Third Parties (TTPs) are:

Certification Authorities responsible for certifying the ownership of public encryption keys.

2 ) Registration Authorities (RAs) verify identities for the CA before a digital certificate is issued

3 ) Issuing Authorities, which are the sole owner of one or more PKIs

*Mobile Network Operators - Share of voice:* From retailers to financial service providers, a large number of organizations are looking to widen their delivery channels to include not just fixed internet but wireless; in essence allowing users to connect, communicate and transact via the mobile handset.

*Mobile device manufacturers:* The importance of the mobile handset must not be underestimated. Its unique portability makes it the perfect payment device even for multi-channel e-commerce environments - a user can surf the Internet on a PC or even digital TV and make a final payment for goods or services using his phone. Whatever its place and no matter how it is used, all of the factors listed in this brief article point to one thing: With the correct approach, the mobile operator, and the mobile phone, will remain central figures in the forthcoming mobile commerce explosion.

#### 28.1.2.1.1.1 Help Desk Services

#### 28.1.2.1.1.2 Security device manufacturers

##### **28.1.2.1.1.2.1 Concerns: Security**

Payment security is often cited as the number one obstacle preventing the widespread uptake of mobile commerce. Real-world transactions use face-to-face contact and hand written signatures to achieve legally binding contracts or to approve a financial transaction. On the Internet, these functions have to be replicated. This can be achieved through Public Key Infrastructure (PKI), a technology that uses matching asymmetric key pairs to achieve the four key principals of a secure Internet:

*Authentication* – Transaction parties provide proof of their identity.

*Confidentiality* - Using encryption increases confidentiality.

*Integrity* – Message is protected against tampering.

*Non-repudiation* – The sender of the message cannot later deny sending the message.

Traditionally a security solution for fixed networks, PKI is now migrating to wireless environments (WPKI – wireless PKI). A user's private key, central to the security of the infrastructure and the enabling feature for authentication and encryption, can now be stored on a SIM card. The inherent strength of the SIM against brute force attacks makes it the perfect tamper-proof device for the storage of these keys. Once embedded in the device the phone allows the user the same functionality as is possible on the fixed Internet, with authentication, confidentiality, integrity and non-repudiation. With this functionality in place, the ability to conduct secure transactions over the phone and signing electronically for goods becomes a reality.

Within any PKI lies the need for a Certification Authority (CA), a central and trusted body, responsible for the issuance of users' key pairs and digital certificates (an online equivalent of a passport), their revocation and overall usage within a transactional environment. Again, with ownership of the mobile users' SIM cards and an existing billing infrastructure the mobile operator is perfectly positioned to accept this role as the central body within the m-commerce universe.

##### **28.1.2.1.1.2.2**

##### **28.1.2.1.1.2.3 STATISTICAL INFORMATION**

**Table 1: Telecommunications Market in Switzerland (in €million)**

	1998	1999	2000*	2001*	99/98 (%)	00/99 (%)	01/00 (%)
Telephone Services (Incl. Internet and Online)	3,261	3,363	3,463	3,558	3.1	3.0	2.7
Mobile	1,210	1,391	1,544	1,689	15.0	11.0	9.4
Switched data & leased line	1,015	1,087	1,147	1,197	7.1	5.5	4.4
CaTV	542	601	670	736	11.0	11.4	9.8
Carrier	6,028	6,443	6,824	7,180	9.6	7.5	6.0

<b>Total</b>	<b>7,454</b>	<b>8,168</b>	<b>8,766</b>	<b>9,289</b>	<b>9.0</b>	<b>7.8</b>	<b>7.0</b>
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(Source: EITO 2000)

(\* = estimated)

**Table 2: Telecommunications market in Switzerland (in \$ million)**

	1998	1999	2000*	2001*	99/98 (%)	00/99 (%)	01/00 (%)
Telephone Services (Incl. Internet and Online)	2,935	3,027	3117	3,202	3.1	3.0	2.7
Mobile	1,089	1,252	1,390	1,520	15.0	11.0	9.4
Switched data & leased line	914	979	1,032	1,077	7.1	5.5	4.4
CaTV	488	541	603	663	11.0	11.4	9.8
Carrier	5,425	5,799	6,142	6,462	9.6	7.5	6.0
<b>Total</b>	<b>6,709</b>	<b>7,351</b>	<b>7,884</b>	<b>8,360</b>	<b>9.0</b>	<b>7.8</b>	<b>7.0</b>

Exchange rate: \$ 1 = €0.9 (All calculations are based on €)

**Table 3: Mobile Voice Market**

	<b>1999</b>	<b>2000</b>	<b>2001*</b>
Users (in millions)	3.6	4.2	4.7
Penetration (percent)	50.0	58.0	65.0

(Source: Post estimates)

28.1.2.2

28.1.2.3

**28.1.2.4** *Table 4: Cellular phones per 100 inhabitants in Switzerland (CH), 2000*

28.1.2.5

28.1.2.6

**28.1.2.7** *Table 5: Reasons for Using wireless Internet access*

28.1.2.8

28.1.2.9

28.1.2.10 *CONTACTS*

## European:

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Homepage: [www.etsi.fr](http://www.etsi.fr)  
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1. Federal Department of Transportation, Communications & Energy  
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Kochergasse 10  
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2. Swiss Communications Commission  
Dr. Fulvio Caccia, President  
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3. Swiss Federal Office for Communications  
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4. Swiss Electro-technical Association  
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URL: [www.sev.ch](http://www.sev.ch)

**Mobile Carrier Contacts:**

1. Swisscom AG  
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Mobile Services  
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CH-3050 Bern  
Tel: (41-31) 342 8000  
Fax: (41-31) 342 9111  
[www.swisscom.com](http://www.swisscom.com)
2. Sunrise AG

Mr. Kim Frimer  
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CH-8048 Zurich  
Tel: (41-1) 555 6111  
Fax: (41-1) 555 6112  
[www.sunrise.ch](http://www.sunrise.ch)

3. DIAX AG  
Mr. Frank Boller,  
Chief Executive Officer  
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Postfach  
CH-8023 Zurich  
Tel: (41-1) 300 4141  
Fax: (41-1) 300 4142  
URL: [www.diax.ch](http://www.diax.ch)
4. Orange Communications (Switzerland) SA  
Mr. Andreas Wetter  
Chief Executive Officer  
2, ave de Gratta-Paille  
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CH-1000 Lausanne 30 Grey  
Tel: (41-21) 641 1027  
Fax: (41-21) 641 1010  
URL: [www.orange.ch](http://www.orange.ch)

## **Associations**

SWICO (Swiss Information and Communications Association)  
Technoparkstrasse 1  
8005 Zurich, Switzerland  
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E-mail: [swicomail@swico.ch](mailto:swicomail@swico.ch)  
URL: [www.swico.ch](http://www.swico.ch)

SIMA (Swiss Interactive Media Association)  
PO Box 1211  
8032 Zurich, Switzerland  
Tel: (41-0878) 800 124  
Fax: (41-0878) 800 125  
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URL: [www.sima.ch](http://www.sima.ch)

## **Trade Shows**

The most important means of trade promotion in Switzerland are trade fairs, conferences and seminars. Swiss executives in this industry sector attend the annual communications and computer show CEBIT in Hannover, Germany, held in March each year.

The most important Swiss trade events for displays and promotions are listed below:

1. Orbit/COMDEX Europe – major autumn conference and exhibition for the European IT industry (the next event is held in Basel from September 25 to 28, 2001).

Contact:

Orbit Industries Fair

Mr. Walter Gammeter

P.O. Box

CH-4021 Basel

Tel: (41-61) 686 2250

Fax: (41-61) 686 2189

E-mail: [wgammeter@messebasel.ch](mailto:wgammeter@messebasel.ch)

URL: [www.orbit.ch](http://www.orbit.ch)

2. TELECOM - quadrennial, World Telecommunications Exhibition and Forum, organized by the International Telecommunication Union ( the next event is held in Geneva in October 2003)

Contact:

Mr. Hans Pieterse

President TELECOM

Place des Nations

CH-1211 Geneva 20

Tel: (41-22) 730 5444

Fax: (41-22) 730 6444

E-mail: [telecominf0@itu.ch](mailto:telecominf0@itu.ch)

URL: [www.itu.ch/telecom](http://www.itu.ch/telecom)

In the U.S. the TELECOM contact is:

TIA Telecommunications Industry Association

2500 Wilson Blvd # 300

Arlington, VA 22201

Tel: (703) 907 7700

Fax: (703) 907 7727

Mr. Henry Wieland, Vice President, Trade Shows & Marketing

Ms. Cathy Tavarozzo, Vice President, Trade Shows & Marketing

URL: [www.tiaonline.org](http://www.tiaonline.org)

3. INTERNET EXPO (iEX) -- annual trade show, usually held in February (next event is held in Zurich from February 6 to February 8, 2002)

Contact:

Compress Information Group

IEX 02

Seestrasse 99

8800 Thalwil, Switzerland

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URL: [www.buyusa.com](http://www.buyusa.com)

URL: [www.uscom.ch](http://www.uscom.ch)

## 29 Turkey

## 30 United Kingdom

## 31 Ukraine

### 31.1 Summary

Wireless Commerce (i.e. conducting business transactions by means of Mobile Communication) is in its early stages of development in Ukraine. E-commerce (i.e. conducting business transactions by internet), is still almost non existent in Ukraine, due to financial and legislative barriers. Wireless Application Protocol (WAP) has only recently been introduced by Mobile Communication (MC) operators. Technically, there are no obstacles to Wireless Commerce in Ukraine, but obstacles exist in the local economy, underdeveloped legislation and lack of a credit card payment system. End summary.

Wireless Commerce is in its infancy in Ukraine. The Ukrainian telecommunication market is currently dominated by voice communications, which account for more than 70 % of total revenues received for telecommunication services. Wireless mobile communication is currently the most active subsector (in customer growth) of the telecom industry in Ukraine. Market penetration for mobile communication is low, with customers numbering no more than 600,000 (as of November 2000) or 1.5 percent of the population. But it is an expanding subsector, because of the investments it has received since 1997, when the GSM900 network was initiated. The number of mobile telecommunication customers double each year, due to significant discounts in fees and the introduction of flexible payment plans.

The most striking feature of the Ukrainian Mobile Communications market is the number of operators. Five operators presently offer wireless mobile services: Ukrainian Mobile Communications (UMC), Kiev Star, Golden Telecom GSM, DCC, Welcom. Service is offered in the following four standards: GSM900/1800 (UMC, Kiev Star, Welcom), NMTi 450 (UMC), DCS 1800 (Golden Telecom GSM), and D-AMPS ( DCC).

A major advantage for MC operators vis-a-vis line operators, is that they don't have to adhere to low telecom tariffs established by the Ukrainian Government (GOU). But since MC operators' only access to the local loop is through state owned Ukrtelecom, and there are more MC operators than the market can support, they are still very vulnerable to decisions made by GOU agencies and Ukrtelecom management. With high tariffs for GSM900 spectrum frequencies squeezing profit margins, a limited customer base, and too many MC operators, the competition in the Mobile Communications market is severe. However, recent investments into the MC sector by EBRD, international telecom equipment manufacturers and service providers, indicate that some market players are still optimistic and ready to invest on future dividends.

In the meantime, the market has started to consolidate around two major operators: UMC (Ukrainian Mobile Communications) and Kiev Star. Total UMC customers reached 285,000 in September of 2000 (compared to 186,000 in March of 2000), and the number of Kiev Star users, has more than tripled during the same time (185,000 as of September 2000). Industry executives speculate that at least two of the remaining MC operators are considering selling their networks, which will further consolidate the market. If the MC market continues to develop at the same rate, total MC users in Ukraine may reach 750,000 by the end of 2000. These numbers are

impressive, when compared to 1998, when there were only 186,000 MC customers (and 320,000 in 1999). Prepaid MC services, mobile banking, mobile Internet SMS and other value-added services have allowed MC operators to attract customers from other telecom sectors, such as paging and trunking.

In May 2000, Kiev Star started offering its clients mobile Internet services based on the Wireless Application Protocol (WAP). UMC's customers joined the WAP club later that year. This service provides customers with access to news, currency exchange rates, weather forecasts, e-mail, etc. A Mobile Internet service package was added later, enabling customers to browse the Internet WAP-sites, and technically operate on a wireless e-commerce and Internet banking system. It should be noted, however, that the number of local WAP-sites is limited and that most mobile handsets used in Ukraine cannot support WAP technology. The WAP project created a link between the two most dynamic sub-sectors of the Ukrainian I.T. and telecommunication markets: wireless mobile communications and the Internet. It now offers opportunities for U.S. exporters of technology and solutions for the mobile Internet and wireless commerce.

E-commerce is slowly gaining popularity in Ukraine, despite the following: lack of a credit card payment system (Ukrainian banks issue debit cards only); the limited number of international credit card holders; and Ukrainian legislation not containing provisions for use of the Internet, e-commerce, and electronic signatures. The number of virtual stores is growing. Their growth rate is far ahead of the growth in the number of customers that use this service. It should be noted, however, that most Ukrainian Internet shops serve mainly as information pages with price lists (with an option to place orders after cash payment or a bank transfer is received). Only a few Internet shops currently accept on-line payment from clients or their partner-banks.

Internet and mobile banking, currently offered in Ukraine is limited to obtaining the status or movement of funds in a bank account, through the Internet or a mobile telephone. Bank clients cannot make transactions via the Internet or mobile phone, due to prohibitive GOU regulations in this area. However, leading Ukrainian banks have started offering their clients basic Internet banking services in anticipation of expected changes in the regulatory environment. They have also joined with leading mobile telecom providers in offering mobile banking as a value-added service, enhancing the provider's competitiveness. In a country with a limited level of integration into the electronic world, the progress made in these virtual services is significant, and shows the wish to join the world of modern technology.

## 32 Uzbekistan